

**Supplementary Table 1.** Frequency (% of 24 plots) of plant species found in the field experiment prior to treatment (pre-treatment 2011) and post-treatment (post-year 1 and post-year 2). Presence of species in the seed bank experiment indicated with ×.

| <i>Species</i>                         | Pre-treatment<br>2011 | Post-year 1<br>2012 | Post-year 2<br>2013 | <i>Seed<br/>Bank</i> |
|----------------------------------------|-----------------------|---------------------|---------------------|----------------------|
| <i>Acer negundo</i>                    | 20.8                  | 25.0                | -                   | -                    |
| <i>Acer rubrum</i>                     | 4.2                   | 8.3                 | -                   | -                    |
| <i>Acorus</i> sp.                      | -                     | -                   | 4.2                 | -                    |
| <i>Agrostis hyemalis</i>               | -                     | -                   | 12.5                | -                    |
| <i>Asclepias incarnata</i>             | -                     | -                   | 4.2                 | -                    |
| <i>Alisma triviale</i>                 | -                     | 16.7                | 16.7                | -                    |
| <i>Bidens</i> spp.                     | -                     | 4.2                 | 20.8                | -                    |
| <i>Calamagrostis canadensis</i>        | 4.2                   | 41.7                | 50.0                | ×                    |
| <i>Caltha palustris</i>                | -                     | -                   | 4.2                 | -                    |
| <i>Campanula aparinoides</i>           | 16.7                  | 4.2                 | 8.3                 | -                    |
| <i>Cicuta bulbifera</i>                | 16.7                  | 29.2                | 41.7                | -                    |
| <i>Cirsium</i> spp.                    | -                     | 8.3                 | 8.3                 | -                    |
| <i>Cornus</i> spp.                     | 4.2                   | -                   | -                   | -                    |
| <i>Carex aquatilis</i>                 | -                     | 16.7                | 20.8                | ×                    |
| <i>Carex gynandra</i>                  | 4.2                   | -                   | -                   | -                    |
| <i>Carex hystericina</i>               | 4.2                   | 33.3                | 66.7                | ×                    |
| <i>Carex lacustris</i>                 | 20.8                  | 8.3                 | -                   | -                    |
| <i>Carex lasiocarpa</i>                | -                     | -                   | 8.3                 | -                    |
| <i>Carex scoparia</i>                  | -                     | -                   | 16.7                | -                    |
| <i>Carex stricta</i>                   | 4.2                   | 8.3                 | 8.3                 | ×                    |
| <i>Carex utriculata</i>                | -                     | -                   | 12.5                | -                    |
| <i>Carex viridula</i>                  | -                     | -                   | 4.2                 | -                    |
| <i>Carex vulpinoidea</i>               | 4.2                   | -                   | 4.2                 | -                    |
| <i>Eleocharis erythropoda</i>          | -                     | -                   | 8.3                 | -                    |
| <i>Eleocharis palustris</i>            | -                     | -                   | 8.3                 | -                    |
| <i>Eleocharis</i> spp.                 | -                     | 16.7                | 8.3                 | -                    |
| <i>Epilobium ciliatum/ parviflorum</i> | 41.7                  | 29.2                | 16.7                | -                    |
| <i>Equisetum arvense</i>               | 8.3                   | 8.3                 | 12.5                | -                    |
| <i>Equisetum fluviatile</i>            | 12.5                  | -                   | -                   | -                    |
| <i>Fraxinus</i> spp.                   | 4.2                   | 33.3                | 12.5                | -                    |
| <i>Galium tinctorium/ trifidum</i>     | 62.5                  | 62.5                | 75.0                | ×                    |
| <i>Impatiens capensis</i>              | 41.7                  | 25.0                | 25.0                | -                    |
| <i>Iris versicolor</i>                 | -                     | 4.2                 | 4.2                 | -                    |
| <i>Juncus</i> spp.                     | -                     | -                   | -                   | ×                    |
| <i>Juncus alpinoarticulatus</i>        | -                     | 37.5                | 41.7                | -                    |
| <i>Juncus balticus</i>                 | -                     | -                   | 4.2                 | ×                    |
| <i>Juncus nodosus</i>                  | -                     | 33.3                | 33.3                | -                    |
| <i>Lemna minor</i>                     | 12.5                  | 20.8                | 12.5                | -                    |
| <i>Lobelia kalmii</i>                  | -                     | -                   | 4.2                 | -                    |
| <i>Lycopus uniflorus</i>               | 4.2                   | 8.3                 | 8.3                 | -                    |
| <i>Lysimachia thyrsiflora</i>          | 41.7                  | 20.8                | 25.0                | -                    |
| <i>Mentha canadensis</i>               | -                     | -                   | 8.3                 | ×                    |

|                                                       |       |       |       |    |
|-------------------------------------------------------|-------|-------|-------|----|
| <i>Mimulus ringens</i>                                | -     | -     | 4.2   | -  |
| <i>Phalaris arundinacea</i>                           | 8.3   | 20.8  | 25.0  | -  |
| <i>Persicaria amphibia</i>                            | 37.5  | 16.7  | 29.2  | -  |
| <i>Persicaria lapathifolia</i>                        | -     | 4.2   | -     | ×  |
| <i>Potentilla anserina</i>                            | -     | -     | 8.3   | -  |
| <i>Ranunculus sceleratus</i>                          | -     | 37.5  | 33.3  | ×  |
| <i>Rorippa palustris</i>                              | -     | 8.3   | 12.5  | ×  |
| <i>Salix</i> spp.                                     | 20.8  | -     | -     | -  |
| <i>Schoenoplectus acutus</i>                          | -     | 8.3   | 16.7  | ×  |
| <i>Schoenoplectus pungens</i>                         | -     | 4.2   | 12.5  | -  |
| <i>Schoenoplectus tabernaemontani</i>                 | -     | 33.3  | 41.7  | -  |
| <i>Scutellaria galericulata</i>                       | 4.2   | 20.8  | 37.5  | -  |
| <i>Sium suave</i>                                     | -     | 12.5  | 16.7  | -  |
| <i>Solanum dulcamara</i>                              | 16.7  | 16.7  | 8.3   | -  |
| <i>Sparganium eurycarpum</i>                          | 4.2   | 20.8  | 16.7  | -  |
| <i>Symphyotrichum puniceum</i> / <i>novae-angliae</i> | 25.0  | 16.7  | 12.5  | -  |
| <i>Symphyotrichum</i> spp.                            | -     | 16.7  | 16.7  | -  |
| <i>Typha</i> × <i>glauca</i>                          | 100.0 | 100.0 | 100.0 | ×  |
| <i>Urtica dioica</i>                                  | -     | -     | 4.2   | -  |
| <i>Utricularia vulgaris</i>                           | -     | 4.2   | -     | -  |
| <i>Verbena hastata</i>                                | -     | 4.2   | -     | -  |
| <i>Vitis riparia</i>                                  | -     | -     | 4.2   | -  |
| Total species (#)                                     | 28    | 41    | 53    | 13 |

**Supplementary Table 2.** Results of indicator species analysis for plant species grouped by stand-age (O: old; Y: young) and treatment (A: above; B: below; C: control). Only plant species which were significantly ( $p < 0.05$ ) related to a group are listed. Indicator values represent the percentage of perfect indication for each group.

| Age-treatment                         | 2011                         |   | 2012 |   |     |       |     | 2013 |      |      |      |     |
|---------------------------------------|------------------------------|---|------|---|-----|-------|-----|------|------|------|------|-----|
|                                       | O                            | Y | O    | Y | A   | B     | C   | O    | Y    | A    | B    | C   |
| Species                               | Indicator value <sup>a</sup> |   |      |   |     |       |     |      |      |      |      |     |
| <i>Symphytotrichum puniceum</i>       | 63*                          | - | -    | - | -   | -     | -   | -    | -    | -    | -    | -   |
| <i>Acer negundo</i>                   | -                            | - | 71*  | - | -   | -     | -   | -    | -    | -    | -    | -   |
| <i>Epilobium parviflorum</i>          | -                            | - | 65*  | - | -   | -     | -   | -    | -    | -    | -    | -   |
| <i>Scutellaria galericulata</i>       | -                            | - | 65*  | - | -   | -     | -   | -    | -    | -    | -    | -   |
| <i>Calamagrostis canadensis</i>       | -                            | - | -    | - | 75* | -     | -   | -    | -    | 83** | -    | -   |
| <i>Juncus nodosus</i>                 | -                            | - | -    | - | -   | 93*** | -   | -    | -    | -    | 85** | -   |
| <i>Schoenoplectus tabernaemontani</i> | -                            | - | -    | - | -   | 93*** | -   | -    | -    | -    | 85** | -   |
| <i>Ranunculus sceleratus</i>          | -                            | - | -    | - | -   | 93*** | -   | -    | -    | -    | -    | -   |
| <i>Juncus alpinoarticulatus</i>       | -                            | - | -    | - | -   | 84**  | -   | -    | -    | -    | 84** | -   |
| <i>Sparganium eurycarpum</i>          | -                            | - | -    | - | -   | 79**  | -   | -    | -    | -    | -    | -   |
| <i>Alisma triviale</i>                | -                            | - | -    | - | -   | 71*   | -   | -    | -    | -    | 71*  | -   |
| <i>Cicuta bulbifera</i>               | -                            | - | -    | - | -   | -     | 71* | -    | -    | -    | -    | -   |
| <i>Galium tinctorium</i>              | -                            | - | -    | - | -   | -     | -   | -    | 83** | -    | -    | -   |
| <i>Persicaria amphibia</i>            | -                            | - | -    | - | -   | -     | -   | -    | 70*  | -    | -    | -   |
| <i>Schoenoplectus acutus</i>          | -                            | - | -    | - | -   | -     | -   | -    | -    | -    | 71*  | -   |
| <i>Impatiens capensis</i>             | -                            | - | -    | - | -   | -     | -   | -    | -    | -    | -    | 66* |

<sup>a</sup>Level of significance ( $p < 0.001$ \*\*\*,  $< 0.01$ \*\*,  $< 0.05$ \*)