

Table 2. Seeded species presence as a percent of the 48 total treatment plots at Bass River Recreation Area, Ottawa County, MI, US. Species are ordered in terms of presence during 2011. Column C corresponds to the coefficient of conservatism for each species specific to Michigan (MDNR 2001).

Family	Species	Common Name	C	2011	2012
Poaceae	<i>Andropogon gerardii</i>	Big Bluestem	5	100.0%	97.9%
Poaceae	<i>Schizachyrium scoparium</i>	Little Bluestem	5	100.0%	100.0%
Poaceae	<i>Sorghastrum nutans</i>	Indiangrass	6	100.0%	100.0%
Lamiaceae	<i>Monarda fistulosa</i>	Wild Bergamot	2	97.9%	95.8%
Asteraceae	<i>Coreopsis lanceolata</i>	Lanceleaf Tickseed	8	93.8%	93.8%
Lamiaceae	<i>Monarda punctata</i>	Spotted Beebalm	4	87.5%	66.7%
Asteraceae	<i>Rudbeckia hirta</i>	Blackeyed Susan	1	83.3%	85.4%
Apocynaceae	<i>Asclepias tuberosa</i>	Butterfly Milkweed	5	77.1%	62.5%
Poaceae	<i>Elymus canadensis</i>	Canada Wildrye	4	43.8%	16.7%
Asteraceae	<i>Ratibida pinnata</i>	Pinnate Prairie Coneflower	4	39.6%	29.2%
Asteraceae	<i>Pseudognaphalium helleri</i>	Heller's Cudweed	2	12.5%	18.8%
Fabaceae	<i>Lupinus perennis</i>	Sundial Lupine	7	12.5%	0.0%
Poaceae	<i>Panicum virgatum</i>	Switchgrass	4	12.5%	8.3%
Asteraceae	<i>Solidago nemoralis</i>	Gray Goldenrod	2	10.4%	8.3%
Asteraceae	<i>Coreopsis tripteris</i>	Tall Tickseed	7	8.3%	2.1%
Fabaceae	<i>Lespedeza capitata</i>	Roundhead Lespedeza	5	6.3%	8.3%
Verbenaceae	<i>Verbena stricta</i>	Hoary Verbena	4	2.1%	4.2%
Asteraceae	<i>Coreopsis palmata</i>	Stiff Tickseed	10	2.1%	2.1%
Asteraceae	<i>Helianthus occidentalis</i>	Fewleaf Sunflower	8	2.1%	2.1%
Asteraceae	<i>Solidago speciosa</i>	Showy Goldenrod	5	2.1%	0.0%
Asteraceae	<i>Solidago juncea</i>	Early Goldenrod	3	0.0%	0.0%
Fabaceae	<i>Tephrosia virginiana</i>	Virginia Tephrosia	10	0.0%	0.0%
Commelinaceae	<i>Tradescantia ohiensis</i>	Bluejacket	5	0.0%	0.0%

entailed dividing each 5 m by 5 m plot into quarters, with two researchers each estimating the cover of two quarters. During both years, each researcher consistently examined the same two quarters within each plot. To standardize visual estimates among researchers, we referred to published area charts (Anderson 1986), and used 0.1 m² PVC frames as a standard area reference. Following data collection, we calculated the relative percent cover (p_i) of each species on each plot by dividing the summed total cover of each species by the summed total cover of the plot.

Data Analysis

Using the relative percent cover calculated for each year, we determined plot diversity using the Shannon index of diversity:

$$1) H' = -\sum p_i \log p_i$$

and Simpson's index of diversity:

$$2) D = 1/\sum p_i^2$$

(McCune and Grace 2002). As recommended by Peet (1974), we used the exponential of H' for analysis, as this indicates the functional number of species in the sample. Interpretations of the results remain the same, with higher values indicating higher diversity. Simpson's index has a range from zero, with a single species present, to one, maximum diversity (Peet 1974). Estimates of percent cover have been used successfully in previous studies to calculate these diversity indices (Potvin and Vasseur 1997, Tilman et al. 1997), and avoid errors resulting from miscounting clonal species if density had been used.

To evaluate community quality, we calculated the mean coefficient of conservatism (\bar{C}), and a floristic quality index (FQI) for each plot to distinguish among treatment combinations containing ubiquitous native plants and those containing species more likely to occur in undisturbed native

plant communities. These methods rely on coefficients of conservatism specific to Michigan (MDNR 2001), ranging from zero, representing ubiquitous native species, to ten, representing highly conserved native species (Taft et al. 1997). FQI was calculated for each plot by multiplying the \bar{C} for the plot by the square root of the number of native species on the plot (Packard and Mutel 1997). Native tree and shrub species are not part of the target prairie community and were excluded from FQI and \bar{C} analysis.

For analyses of community composition, we classified species into one of six groups: non-native forbs, knapweed, non-native grasses, native graminoids, native forbs, and tree/shrub species. The non-native forbs group does not include knapweed. As the dominant invasive species and a focus of our research, knapweed was classified independently. Following this classification, we calculated the relative percent cover for each group by summing the relative percent