

## Appendix S1. Beneficiary species' life history strategies and relative competitive response abilities and stress tolerances

Beneficiary species		Life history strategy	Competitive response ability	Tolerance to water & heat stress	Tolerance to herbivory stress
<i>Elymus elymoides</i>	native	shallow rooted, perennial bunchgrass	high <sup>1</sup>	low <sup>2</sup>	moderate <sup>3</sup>
<i>Poa secunda</i>	native	shallow rooted, perennial bunchgrass	high <sup>1</sup>	low <sup>2</sup>	moderate <sup>3</sup>
<i>Pseudoroegneria spicata</i>	native	deep rooted, perennial bunchgrass	moderate	moderate <sup>4</sup>	low <sup>5</sup>
<i>Achanatherum thurberianum</i>	native	deep rooted, perennial bunchgrass	moderate	moderate <sup>4</sup>	low <sup>5</sup>
<i>Hespirostipa comata</i>	native	deep rooted, perennial bunchgrass	low	high <sup>6</sup>	low <sup>7</sup>
<i>Achnatherum hymenoides</i>	native	deep rooted, perennial bunchgrass	low	high <sup>6</sup>	low <sup>7</sup>
<i>Bromus tectorum</i>	non-native	invasive, annual grass	moderate	high <sup>8</sup>	high <sup>8</sup>
<i>Lepidium perfoliatum</i>	non-native	annual forb	moderate	high <sup>8</sup>	high <sup>8</sup>

<sup>1</sup> Hironaka, M. and E. W. Tisdale. 1972. Growth and development of *Sitanion hystrix* and *Poa sandbergii*, Desert Biome. U.S. International Biological Program RM 72-24.

<sup>1</sup> Humphrey, D. L. and E. W. Schupp. 2004. Competition as a barrier to establishment of a native perennial grass (*Elymus elymoides*) in alien annual grass (*Bromus tectorum*) communities. Journal of Arid Environments 58: 405-422.

<sup>2</sup> Link, S. O. G., W.G; J.L. Downs. 1990. The effect of water stress on phenological and ecophysiological characteristics of cheatgrass and Sandberg's bluegrass. Journal of Range Management 43: 506-513.

<sup>2</sup> Johnson, D. A. and L. Aguirre. 1991. Effect of water on morphological development of seedlings of three range grasses: root branching patterns. Journal of Range Management 44: 355-360.

<sup>3</sup> Trilica, M. J. and C. W. Cook. 1971. Defoliation effects on carbohydrate reserves of desert species. Journal of Range Management 24: 418-425.

- <sup>4</sup> Blaisdell, J. P. and J. F. Pechanec. 1949. Effects of Herbage Removal at Various Dates on Vigor of Bluebunch Wheatgrass and Arrowleaf Balsamroot. *Ecology* 30: 298-305.
- <sup>5</sup> Mueggler, W. F. 1975. Rate and pattern of vigor recovery in Idaho fescue and Bluebunch wheatgrass. *Journal of Range Management* 28: 198-204.
- <sup>5</sup> Ganskopp, D. 1988. Defoliation of Thurber needlegrass: herbage and root responses. *Journal of Range Management* 41: 472-476.
- <sup>6</sup> Platou, K. A., P. T. Tueller, S. G. Leonard and R. L. Miles. 1986. Soil properties associated with six common grasses of the Great Basin. *Journal of Soil and Water Conservation* 41: 417-421.
- <sup>7</sup> Rickard, W. H., D. W. Uresk and J. F. Cline. 1975. Impact of cattle grazing on three perennial grasses in south-central Washington. *Journal of Range Management* 28: 108-112.
- <sup>8</sup> Archer, S. and D. A. Pyke. 1991. Plant-animal interactions affecting plant establishment and persistence on revegetated rangeland. *Journal of Range Management* 44: 558-565.
- <sup>8</sup> Hempy-Mayer, K. and D. A. Pyke. 2009. Defoliation effects on *Bromus tectorum* seed production: implications for grazing. *Rangeland Ecology & Management* 61: 116-123.