

Ecological Restoration Brief

Reprinted from TXSER Quarterly Newsletter

ERB No. 29

March 2017

Invasive Species in Riparian Zones: Is Eradication the Only Option?

Ingrid Karklins
Ecologist

Environmental Survey Consulting, Inc., Austin, Texas

As “critical transition zones” experiencing fast and frequent organism and material inputs (Ewel et al. 2001), riparian area species composition and function can change rapidly and radically. The result of plant species competition is often the formation of novel ecosystems dominated by invasive species (Richardson et al. 2007). Traditional restoration techniques involve complete removal of the invading species via repeated and costly mechanical and chemical treatments (Hanula et al. 2009). Alternatively, careful reductions in invasive monocultures may allow for the development of transitional ecosystems that provide shade, litter and other benefits for native species reintroduction and establishment. Working within the limitations of a novel or no-analogue ecosystem while recognizing existing potential benefits may be a more effective restoration strategy (Hobbs et al. 2006), reducing costly post-restoration management.



Chinese Privet (*Ligustrum sinense*)
Photo credit: Gwen Thomas

Introduced from Europe and Asia in the mid-1800s, various *Ligustrum* species were brought to the United States as ornamentals (Texas Invasives.org 2008). Over the course of several growing seasons, *Ligustrum* can outcompete native species and create novel ecosystems or even develop understory monoculture forests, most prominent in urban areas (Hanula et al. 2009). Once a novel ecosystem has crossed a biotic threshold to reach a new stable state, efforts to restore historic conditions and processes can be cost-prohibitive and a hopelessly ideal quest to fix the unfixable (Hobbs et al. 2006). Attempts to manage novel ecosystems may

actually perpetuate their undesirable features. Instead, restoration efforts should focus on maintaining system resiliency and biogeochemical functions, and enhancing species diversity (Seastedt et al. 2008).



NPSOT Volunteers remove Chinese privet in Boerne.
Photo credit: Paul Barwick

Invasive species eradication can result in desert-like landscapes with intense light exposure, low soil nutrients and high erosion rates. Subsequent plantings of native species have little chance of survival in such extreme conditions (Hobbs et al. 2006). Unfavorable conditions can facilitate the establishment of other nonnative species (Hanula et al. 2009). In one study, *Ligustrum* removal resulted in early succession/disturbance species colonization which did not meet the restoration goals; although results were dissimilar from the original *Ligustrum*-dominated ecosystem (Hanula et al. 2009).

An alternative to complete removal is working with the existing alternative state to allow for a gradual transition. A gradual species transition may be facilitated by girdling invasive canopy trees and providing shade and cover for native species in the understory (Funk and McDaniel 2010). As the invasive species undergo a gradual dieback, returning native vegetation has the competitive advantage.

Even if not in pristine or historical conditions, alternative states might still have the capacity to provide a broad range of ecosystem services (Pennington et al. 2010) while providing spiritual and aesthetic benefits to urban populations. Constantly threatened by nonnative species, remnant urban vegetation can augment quality of life for human communities by establishing a connection with nature (Miller 2005). It is possible for carefully considered restoration strategies to result in economically, ecologically and socially balanced solutions.

Works cited

- Ewel, K. C., C. Cressa, R. T. Kneib, P. S. Lake, L. A. Levin, M. A. Palmer, P. Snelgrove, and D. H. Wall. 2001. Managing critical transition zones. *Ecosystems* **4**:452-460.
- Funk, J. L. and S. McDaniel. 2010. Altering light availability to restore invaded forest: the predictive role of plant traits. *Restoration Ecology* **18**:865-872.
- Hanula, J. L., S. Horn, and J. W. Taylor. 2009. Chinese privet (*Ligustrum sinense*) removal and its effect on native plant communities of riparian forests. *Invasive Plant Science and Management* **2**:292-300.
- Hobbs, R. J., S. Arico, J. Aronson, J. S. Baron, P. Bridgewater, V. A. Cramer, P. R. Epstein, J. J. Ewel, C. A. Klink, A. E. Lugo, D. Norton, D. Ojima, D. M. Richardson, E. W. Sanderson, F. Valladares, M. Vil, R. Zamora, and M. Zobel. 2006. Novel ecosystems: theoretical and management aspects of the new ecological world order. *Global Ecology & Biogeography* **15**:1-7.

- Miller, J. R. 2005. Biodiversity conservation and the extinction of experience. *Trends in Ecology & Evolution* **20**:430-434.
- Pennington, D. N., J. R. Hansel, and D. L. Gorchov. 2010. Urbanization and riparian forest woody communities: Diversity, composition, and structure within a metropolitan landscape. *Biological Conservation* **143**:182-194.
- Richardson, D. M., P. M. Holmes, K. J. Esler, S. M. Galatowitsch, J. C. Stromberg, S. P. Kirkman, P. Pyšek, and R. J. Hobbs. 2007. Riparian vegetation: degradation, alien plant invasions, and restoration prospects. *Diversity & Distributions* **13**:126-139.
- Seastedt, T. R., R. J. Hobbs, and K. N. Suding. 2008. Management of novel ecosystems: are novel approaches required? *Frontiers in Ecology and the Environment* **6**:547-553.
- Texas Invasives.org. 2008. *Ligustrum sinense*.
<http://texasinvasives.org/plant_database/detail.php?symbol=LISI>

The Society for Ecological Restoration, Texas Chapter promotes ecological restoration as a means of sustaining the diversity of life on Earth and re-establishing an ecologically healthy relationship between nature and culture.

For more information on TXSER visit: www.txser.org