Acknowledgment

The editors thank Chris Reyes for translating portions of this note.

Reference

Parra, A. 2004. Estrategias de restauración de comunidades boscosas nativas degradadas en un contexto intercultural. Master's thesis, Universidad Católica de Temuko, Chile.

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Cultural Keystone Species: Implications for Ecological Conservation and Restoration. 2004. Garibaldi, A. and N. Turner, School of Environmental Studies, University of Victoria, Victoria, British Columbia, Canada V8W 2Y2, 250/721-6124, Fax: 250/721-8985, nturner@uvic.ca. **Ecology and Society** 9(3):1. www.ecologyandsociety.org/vol9/iss3/art1.

Garibaldi and Turner discuss cultural keystone species of vital importance to indigenous peoples as food, medicine or material, and the need to mesh cultural and ecological knowledge about these species. Examples are taken from the Pacific Northwest coast, including western red-cedar (*Thuja plicata*), edible red laver seaweed (*Porphyra abbottiae*), and wapato (*Sagittaria latifolia*). The authors write that restoration of cultural keystone species can provide a good starting point for ecological restoration by providing incentive for local support and for gaining access to traditional knowledge of keystone species in relation to other species.

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Participatory Approach for Rapid Assessment of Plant Diversity Through a Folk Classification System in a Tropical Rainforest: Case Study in Xishuangbanna, China. 2004. Wang, J., H. Liu, Xishuangbanna Tropical Botanical Garden, The Chinese Academy of Sciences, Yunnan 666303, China, liuhm@xtbg.ac.cn; H. Hu and L. Gao. **Conservation Biology** 18(4):1139-1142.

The authors compared the differences in number of plant species identified between scientific classification and the folk classification of the Dai people in southwestern Yunnan, China. They found the Dai people identified more than 80 percent of the species, and that correspondence between folk and scientific classifications was 87.7 percent. The authors write that folk plant classifications would be useful for rapid assessment of plant species in some areas, and would "contribute to conservation of both indigenous knowledge and regional biodiversity."

MANAGEMENT & MONITORING

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Wood-chip Mulch Improves Woody Plant Survival and Establishment at No-maintenance Restoration Site (Washington)

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Developing effective methods for long-term weed control is especially important for restoration projects where weeding, watering, and other aftercare may be minimal. Our study compared the relative effectiveness of wood chip mulch and glyphosate herbicide (Roundup) at controlling invasive weeds and improving the survival of woody plants receiving no supplemental water or other maintenance. We hypothesized that plants in mulch plots would have higher survival and growth rates than plants in plots treated with herbicide prior to planting.

Our experiment site was within the Union Bay Natural Area (UBNA) at the University of Washington's Center for Urban Horticulture. Originally a wetland, the area was used as a landfill from 1925 until 1965, when it was capped with excavated soil and seeded with nonindigenous pasture grasses (Jones 1976). The area is currently a weedy grassland, although continued subsidence is creating ephemeral wetlands. The soils tend to be saturated in winter and dry in summer, making plant establishment difficult. The soil atop the cap is young and uniform in color without any distinctive horizons and little organic matter.

We used three species native to the Pacific Northwest and commonly used in local restoration projects: snowberry (*Symphoricarpos albus*), red-flowering currant (*Ribes sanguineum*), and oceanspray (*Holodiscus discolor*).

In fall 1999, we created six 10-m x 10-m plots in UBNA. All plots were mowed to remove aboveground vegetation, and then randomly assigned to a treatment—three were sprayed with a 2-percent Roundup solution and three were covered with about 8 inches (20 cm) of wood chip mulch. The herbicide-treated plants were subjected to a foliar spray until their leaf surfaces were wet. Two weeks later, dead turf was tilled and left undisturbed until the following spring.

In March 2000, we established planting grids for each plot consisting of ten rows spaced about 1 ft (0.3 m) apart. We installed the bareroot plants before their first leaves sprouted. We planted red-flowering currant in the first three rows in the northwest corner of each plot, oceanspray in the southernmost row only, and 11 snowberries in each row. We made furrows to the soil surface and dug planting holes to the same depth as the root mass and about 1.5 times as wide. Roots were spread as evenly as possible, and the backfill soil was unamended. After installation, we respread mulch around plants in the mulch plots. The plants received no supplemental water, weeding, pruning, or other maintenance.

Beginning in 2001, we conducted an annual plant count each spring to determine survival percentages for each species and treatment. In addition, we analyzed the relative success of both test plants and weedy plants. In 2001 and 2003, we measured the height of each test plant from the root crown to the tip of the tallest stem. After gathering the data, we calculated the mean height for each species within each plot and treatment. In addition, the survival percentages were averaged for the three plots per treatment. The data were analyzed using ANOVA to check for significant differences between plots and treatments, with significance set at $p < 0.05$.

Each spring, we noted that plants in mulched plots leafed out sooner, began growing faster, and generally were larger and healthier looking than those in herbicide-treated plots. These trends continued, with higher mortality and smaller plants in the herbicide-treated plots (Figure 1).

For snowberries, the higher survival rates for mulched plants one year after planting seemed to indicate better establishment and a higher chance of survival in subsequent years. By 2003, snowberries were reproducing in all the mulched plots, which resulted in snowberry seedlings in both the mulched and herbicide plots. Snowberries in herbicide-treated plots did not produce fruit. Looking at species and treatments from year to year shows a general decline in survival in all plots with two exceptions—mulched snowberries, and herbicide-treated oceanspray (Figure 1). Overall, red-flowering currant and oceanspray had a harder time establishing and were more susceptible to drought and other stresses.

One factor influencing the varied treatment success may have been the relative success of weedy plants. The mulched plots generally had fewer weeds, especially in the first two years after installation. These weeds, although large and healthy, didn't seem to affect the mulched plants because those plants had a few years to grow and establish. Early and rampant weed growth in the herbicide-treated plots made it quite difficult to find the test plants, particularly snowberry and oceanspray, and likely contributed to the lower survival rates in these plots (Figure 1).

Given our findings, we believe that all woody plants at restoration sites, particularly those receiving no supplemental water or weeding, should be mulched. A thick layer of wood chips or other organic material will help retain the soil moisture, help control weeds, reduce soil erosion, provide organic matter to plants and soil organisms, and moderate soil temperatures (Greenly and Rakow 1995, Brady and Weil 1999). While standard restoration practice often consists of applying mulch in a small ring around individual plants, it is doubtlessly more effective to mulch the entire site. These benefits, combined with other good management practices, can improve the success and survival of restoration sites while reducing the need for aftercare.

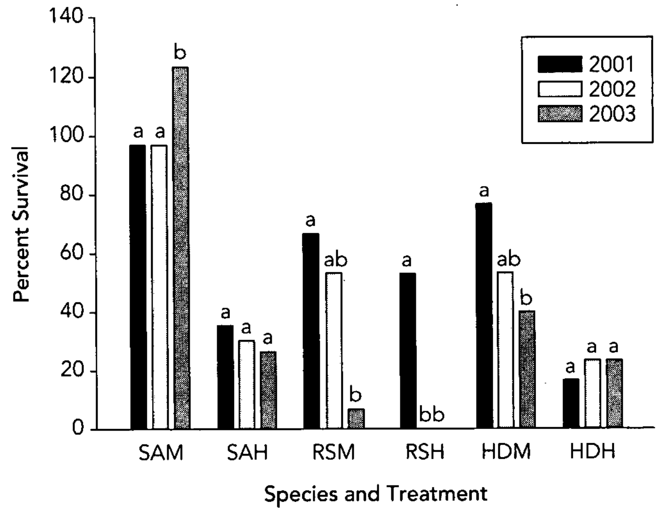

Figure 1. Mean survival percentages (± SE). A year-by-year comparison. Within each species and treatment, (cluster of 3) bars with the same letter(s) were not significantly different ($p > 0.05$, $n = 3$). SAM = *Symphoricarpos albus* mulch, SAH = *S. albus* herbicide, RSM = *Ribes sanguineum* mulch, RSH = *R. sanguineum* herbicide, HDM = *Holodiscus discolor* mulch, and HDH = *H. discolor* herbicide.

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An Index of Invasion for the Ground Layer of Riparian Forest Vegetation. 2004. Luken, J.O., Dept. of Biology, Coastal Carolina University, Conway, SC 29528-6054, JoLuken@coastal.edu. **Natural Areas Journal** 24(4):336-340.

Luken's Index of Invasion (II) combines plant coverage data with regional lists of invasive plants to rapidly assess sites for their vulnerability to invasion. The II uses three measures (from highest to lowest weighted importance): 1) current invasion (identify the dominant species and rank them according to the local invasives listing), 2) potential invasion (identify species that cover more than 90 percent in at least one plot), and 3) sources of invaders (identify adjacent landscape features that facilitate plant migration). Lukens tested his methodology using data from 14 riparian sites within and near the Land Between the Lakes National Recreation Area (LBLNRA) in western Kentucky, and compared the results with an earlier community analysis and with two other indices of integrity: the Floristic Quality Assessment Index and the Minnesota Index of Vegetative Integrity. All four studies suggested lower integrity (less diverse and more invaded) for sites outside the LBLNRA, but the II did not show a significant difference between sites, indicating that invasion was not the only explanation.