but to reduce the density and distribution to a point where they do not interfere with fires by shading out grasses. In 2006 we selected four more clones for control, the largest of which was about 300 m^2 with a stem density of 4 per m^2, or about 1,200 stems. Stem dbh ranged from 1.3 to 2.5 cm and height from 1 to 2 m. The girdling season in south-central Wisconsin runs from mid-April until mid-August, when the bark easily slips away. By working a little each day, Amy Jo Dusick and Becky Rauwald were able to girdle every stem in these clones beginning in early May until the end of July. In early October they counted 75 stems that resprouted or survived the girdling—a survival rate of only 16 percent.

Anyone can learn the girdling technique in a few minutes and can effectively girdle about one hundred stems in an hour. The technique does not require special strength or exertion and the tool can be carried in a back pocket so it is always at hand. To see a slideshow of how we make and use our butter knife girdling tool, visit the *Ecological Restoration* website at http://ecologicalrestoration.info.

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DoD Develops Sound Monitoring Effort. 2006. Dalsimer, A., HydroGeoLogic, Inc., 703/736-4570, adalsimer@hgl.com; and J. Thigpen. **Endangered Species Bulletin** 31(2):36–37. www.fws.gov/endangered/bulletin.html.

Dalsimer and Thigpen describe new technology developed by the U.S. Department of Defense's Strategic Environmental Research and Development Program to remotely detect and track audio signals. Digital acoustic recording tags can be attached to large animals or airborne monitoring systems such as weather balloons. These autonomous devices can collect data over extended periods, and have been used to monitor distribution, abundance and behavior of species and populations that are difficult to study with traditional methods, including bats, marine mammals, and songbirds in hazardous artillery range locations. This technology is expected to reduce monitoring costs, since relatively cheap automated devices can replace labor intensive survey techniques.

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An update on Chestnut DNA Projects Part II: Other Uses of Molecular Markers in the TACF Breeding Program. 2006. Sisco, P.H., Southern Appalachian Regional Office, The American Chestnut Foundation. **The Journal of the American Chestnut Foundation** 20(2):35–43.

Sisco uses unpublished data to illustrate how DNA testing can assist efforts to breed blight-resistant American chestnut (*Castanea dentata*) trees. DNA testing can determine both pollen and seed parents of a given tree, allowing researchers to exclude offspring arising from pollen contamination in closed-pollination experiment or over-represented parents in open-pollination experiments, and to identify parents of blight-resistant. It can also establish the percentage and location of Chinese chestnut (*C. mollissima*) genetic material in hybridized offspring, which may allow researchers to identify genes associated with blight resistance. Sisco cautions that neutral markers located in "junk DNA" are very helpful for determining parentage but do not provide an indication of the genetic diversity of actual adaptive traits. Common garden experiments are needed to assess this.

Cultural Restoration

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Rivercane Restoration Project: Recovering an Ecologically and Culturally Significant Species (North Carolina)

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Giant cane (*Arundinaria gigantea*), commonly known as rivercane, is a bamboo species native to the United States (Triplett et al. 2006) of significant cultural importance to the Eastern Band of Cherokee Indians (EBCI) in western North Carolina. Rivercane was once abundant on floodplains of the southeastern United States, but agriculture and development have significantly diminished its presence. Tribal artisans use cane to create high-quality baskets, mats, blowguns, and other crafts. The cane must have certain physical characteristics to be used for these traditional arts. Culm diameters must exceed 2.54 cm for blowguns, and the first branches must emerge more than 1.8 m from the ground for basketry. Because cane with these qualities is now scarce in this region, the EBCI has partnered with researchers at Western Carolina University to launch the Rivercane Restoration Project (RRP). The primary objective of the RRP is to develop a science-based plan for restoring artisan-quality rivercane to the landscape in western North Carolina. The project includes geologists, ecologists, and botanists as well as advisory artisans from the EBCI.

In December 2005, we began the first phase of the RRP by building a geographic information system (GIS) database of existing rivercane brakes in western North Carolina. At each site, we delineated and mapped the perimeter of the canebrake using a Trimble GeoXM Global Positioning System handheld unit. We then characterized the rivercane brake by recording plant and site properties, such as maximum cane height, culm diameter, culm density, elevation, and associated species (Figure 1). The database currently contains 45 sites. We found that culms at these sites average 1.5 cm in diameter and 3.8 m in height. Brakes range from 0.01 to 2.89 acres and site elevations range

from 1,640 to 2,275 feet. Plants associated with rivercane include the exotic Japanese honeysuckle (*Lonicera japonica*) and multiflora rose (*Rosa multiflora*), and three native species—jewelweed (*Impatiens capensis*), black walnut (*Juglans nigra*), and sycamore (*Planatus occidentalis*).

These data are valuable but must be viewed with the understanding that these rivercane sites are remnants that have been affected by environmental marginalization as well as by selective harvesting by modern Cherokee artisans. The fact that certain culms are selectively removed and that no records have been kept of this removal makes scientific analysis problematic. Nevertheless, the GIS database allows for development of a sampling strategy for later phases of the RRP and will provide a framework from which a regional rivercane management plan can be developed.

Phase two of the RRP involves a detailed characterization of the physical parameters within which rivercane currently exists on the landscape. We are systematically analyzing soil cores from 25 sites for soil properties (for example, clay, sand, and loam), sediment size, nutrient level, and hydraulic conductivity. Preliminary results from this work indicate that rivercane grows in soil that is loamy sand with higher levels of calcium compared to other nutrients, and a pH between 6.0 and 7.0. In addition, transects of cores are being collected across cane brakes perpendicular to the neighboring stream channel in order to assess the effect of cane brakes on nutrient transport and to assess the relationship between soil particle size, nutrient availability, and distance from stream channel.

For phase three, we will incorporate data from phases one and two to develop boundary conditions for rivercane restoration sites in western North Carolina. These parameters will be used to identify restoration sites with the highest probability of success on EBCI tribal land, private land, at Western Carolina University, and in cooperation with other local entities, such as the Little Tennessee Land Trust. Project partners will also develop an educational outreach program informing local landowners about the benefits of rivercane. Cane is a highly effective riparian buffer that excels at removing sediment from runoff (Schoonover et al. 2006) and its dense network of rhizomes improves bank stability in the rooting zone. These characteristics should be attractive to landowners, especially in light of recent local flooding from the extremely active 2004 hurricane season.

Despite the value of canebrakes for cultural, biological, aesthetic and historical reasons, some landowners opt to destroy canebrakes. This practice not only harms current preservation efforts but also future restoration efforts because transplantation techniques are currently limited. Dattilo and Rhoades (2005) used a transplantation methodology that was highly successful but used whole culms with intact root balls and required a "donor" canebrake. Such culms are commercially available but are prohibitively expensive for large-scale restoration efforts. Moreover, they originate from regions other than the southeast, which could potentially compromise the genetic integrity of local populations. All of the above challenges and issues make this particular project an excellent case study of the integration of science with local management and culture.

Figure 1. Katie McDowell examines giant cane in Jackson County, North Carolina. Note cut trail and lack of understory in this mature, unshaded canebrake. Photo by Adam Griffith

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Traditional Gathering of Native *Hula* Plants in Alien-invaded Hawaiian Forests: Adaptive Practices, Impacts on Alien Invasive Species and Conservation Implications. 2006. Ticktin, T., Botany Dept., University of Hawai'i at Mānoa, 3190 Maile Way, Honolulu, HI 96822, 808/956-3928, ticktin@hawaii.edu; A.N. Whitehead and H. Fraiola. **Environmental Conservation** 33(3):185–194.

Concerned about steadily declining cultural and natural resources, these researchers studied methods used to collect the fern fronds of palapalai (*Microlepia strigosa*) and pala'ā (*Sphenomeris chinensis*) and the fruits of the shrubby tree mokihana (*Melicope anisata*), for use in traditional *leis* and *hula* rituals. Harvesting of palapalai fronds significantly reduced its cover for one year, but non-native cover