HAND PAPERMAKING

VOLUME 25, NUMBER 1 • SUMMER 2010

FRONT COVER: *Mulberry plant growing outside the book and paper studio at Penland School of Crafts in North Carolina. August 2009. Photo by and courtesy of Amy Richard.*

BACK COVER: *Patterson Clark,* White Mulberry, June 18, *2009, 17 x 11 inches, artist-made invasive white mulberry (*Morus alba*) paper, ink, and block. Photo by and courtesy of the artist.*

Using Invasive Plant Fibers Responsibly

JULIE JOHNSON

Parents and children from a school environmental club harvested the invasive yellow flag iris leaves from a wetland in Portland, Oregon, September 2009. This activity required a special use permit from the sponsoring land managers. The leaves were made into cards which were sold as a fundraiser to increase invasive plant awareness in their community and to sponsor native plant purchases for the school grounds. All photos by and courtesy of the author.

ON FACING PAGE: *Pat Feeney Murrell,* Merrily, Merrily Down the Stream, *2009, 10 x 18 5/8 x 2 inches (closed); French door structure with variable size, BFK Rives 140 lb. print accordion pages. Documents a Japanese knotweed eradication and stream restoration project. Photo by and courtesy of Larry Murrell.*

On a global basis...the two great destroyers of biodiversity are, first habitat destruction and, second, invasion by exotic species.
—E.O. Wilson

As a fiber artist, I have spent decades harvesting plants to make paper, baskets, cordage, and dyes. I live in the Pacific Northwest, an ecosystem rich with native plants, although increasingly threatened by invading nonnative species. I also work with a group of US Forest Service natural resource professionals charged with fighting not only nonnative invasive terrestrial and aquatic plants, but also invasive animals, insects, and pathogens. Working with Forest Health Protection experts in Oregon and Washington has given me a glimpse into the devastating economic and environmental effects of these nonnative invasive species (also referred to as NNIS, exotics, aliens, invasive weeds, invaders, and invasives).

In 1999, Federal Executive Order 11312 on Invasive Species called for federal agencies to minimize the economic, ecological, and human health impacts caused by invasive species and, as stated in the order, to: "actively prevent the introduction of invasive species; manage and control invasive species; and provide public education to support these efforts."[1]

The "public education" portion of this order, coupled with my knowledge of the problem, is what originally inspired me to incorporate invasive plant fibers into my art. I wanted to provide a physical link to the issue and bring public awareness to the ecological crisis by engaging with the invasives interpretively, interactively, and aesthetically.

When I started working with exotic plant fibers in the studio and in my teaching, I realized that I had a lot of research to conduct before bringing the idea to a public audience. Using invasive plants brought my own harvest, transport, and processing techniques under scrutiny. Was I, at any point in my process, inadvertently furthering the spread of invasives? Was I putting my health or the health of others at risk by unknowingly harvesting herbicide-treated plant material? Was I breaking laws simply by harvesting and transporting these weeds? Many of these questions originate from my work as a

federal employee, but I have conducted most of my research as a private citizen, working with many local, regional, county, state, and federal land management agencies, with private land owners, and conservation groups. Building relationships with and learning from the natural resource professionals in my community has been an extremely important and rewarding part of the experience.

I use invasive plants in papermaking primarily for educational purposes. I often bring pre-processed weed pulps to schools to make paper with children. Some of my favorite invasives for teaching are Japanese knotweed, yellow flag iris, and reed canary grass. If the targeted weed makes a poor-quality pulp, I add scraps of archival, cotton rag mat board from a framing shop, which adds recycling to the lesson. Discussing the weeds over a draining mould is an interactive way to increase awareness with a captive audience! For a deeper connection to the ecosystem, I have organized field trips for children (and their parents) to participate in harvesting and eradicating the plants that they use to make paper. A plant's destructive impacts are most strongly experienced firsthand, in the ecosystem. Recently I led a middle school's environmental club through the process of obtaining a special use permit to work with land managers in eradicating clumps of *Iris pseudacorus* (yellow flag water iris) from a local wetland. The children harvested the leaves, processed them into pulp, and made paper. They also dug up the roots to make dye. Because the wetland is part of their urban environment, the children now have a new sense of ownership, watching native plants become re-established at the site.

Many artists have come to use invasives in their work. One of the most beautifully synthesized approaches to invasive-plant-based education and art has been created by Washington DC artist Patterson Clark. His website, www.alienweeds.com, is a wonderfully presented educational resource and a showcase of his artwork which employs alien weeds to an exciting extreme. Clark uses exotics in every step of creating his woodblock prints including the paper, ink, pigment, and woodblock. In his teaching, Clark instructs and inspires students in the use of exotics. In 2008 he taught a one-week seminar "Sustainable Papermaking with Alien Weeds" at Middle Tennessee State University. With a special use permit from the National Park Service, Clark led students through the process of responsibly harvesting and processing invasive plants, which they used to make paper, pigment, and woodblock prints.

In another twist on invasive-plant-based art, New Jersey sculptor and book artist Pat Feeney Murrell documented a stream restoration project in her artist book called *Merrily, Merrily Down the Stream*. The book bears witness to the hundreds of volunteer hours her husband Larry Murrell and members of their community dedicated to working with local officials in removing debris and eradicating a twenty-year-old monoculture of Japanese knotweed that blocked water flow and caused flooding in their neighborhood. The book documents the experience and serves as a visual aid for the benefit of other municipalities who are fighting Japanese knotweed in their riparian areas.[2]

Nonnative weeds are a critical and growing problem in ecosystems around the world. It is estimated that exotics have invaded up to 50 percent of America's croplands, pasturelands, and public lands; and that nonnative weeds are spreading at an alarming rate of 1.75 million acres per year, causing $50 billion annually in environmental and agricultural damage.[3] Artists who use exotics as source material must not contribute to the problem of invasive proliferation.

What follows are, at best, general guidelines to help artists minimize the potential for furthering the spread of noxious weeds.

• Identify the land owner. If it is a public agency, work with the land managers to ensure that the proposed method and timing of removal meet with existing laws, regulations, and/or policies. Obtain verbal, written permission, or special use permits as required.

Julie Johnson, The Face of Invasives, *2004, 11 inches diameter x 2 inches deep, artist-made nonnative* Phalaris arundinacea *(reed canary grass) paper face, painted with* Hypericum perforatum *(St. John's wort) flower dye, surrounded by* Equisetum telmateia *(giant horsetail) and* Rumex crispus *(curly dock) papers on a background of native* Thuja placata *(western red cedar) bark paper. Comment on humans causing the introduction and spread of most invasive species.*

• If the targeted plants are on privately owned land, take the opportunity to educate the owner by identifying the weeds, offering assistance with eradication, and helping to reestablish native plant populations. This is a community-service opportunity that benefits the owner, the surrounding community, and the ecosystem.

• Research and thoroughly acquaint yourself with a plant before harvesting. Work with local experts to determine appropriate and legal harvest practices for eradication and prevention of spread.

• Identify how the plant propagates. Some plants are so vigorous that they can propagate not only from their roots and seeds, but also from pieces of stalk (e.g., Japanese knotweed).

• Determine any toxins that the plant may contain. Invasive plants often manufacture compounds that not only help them muscle out other plant species, but may also negatively affect humans.

• Seeds are most plants' primary dispersal mechanism, so it is important to time the harvest before seeds set and ripen. If seeds are present at harvest, place a bag over the entire seed head and snip directly into the bag. Secure and dispose of bags in regular garbage, not yard debris or compost.

• Transport plant material only after it has been 100-percent contained and secured in heavy duty, thick-walled plastic trash bags. Some invasive species are so insidious that land management policies require on-site incineration of plant material, not removal (e.g., rice bulrush on national wildlife refuges in the state of Washington).

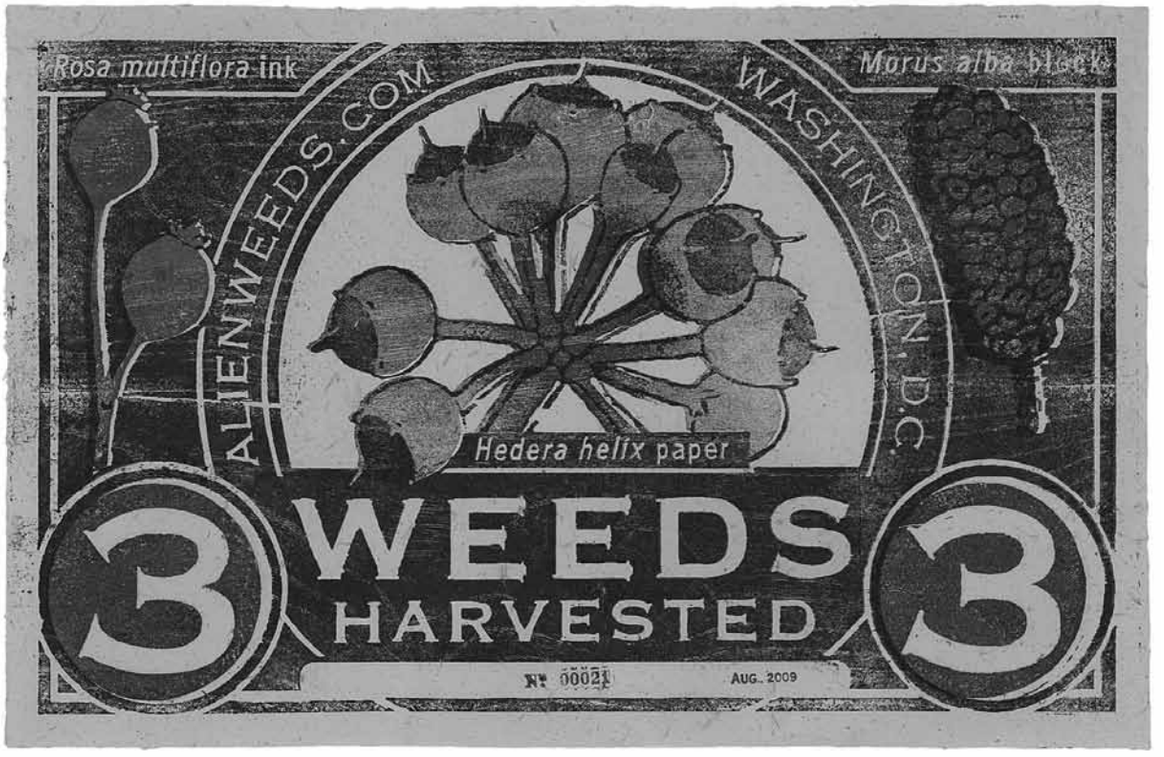
• Process live plant material indoors to prevent introduction. If you process outdoors, do it on a hard surface like a deck, patio, or driveway, so plant fragments can be easily identified and contained.

• After processing, secure leftover, unused plant material in bags and dispose in the regular garbage. Composting or dumping NNIS in yard debris can lead to widespread dispersal when plant parts or seeds escape from commercial or personal composting sites. This is especially true for those located near green spaces and urban interfaces.

• Do not send plant material, seeds, or paper made with seeds to other parts of the country or to other parts of the world! After experiencing severe ecological and economic damage from NNIS, many countries have strict laws prohibiting the introduction of unregulated plant material.

• Remember that locally native plants can be invaders in a foreign ecosystem. Further, locally native insects and/or diseases that plant materials harbor can be even more destructive than plants to a foreign ecosystem. Some examples of nonnative insects that have wreaked havoc in the United States are emerald ash borer, hemlock woolly adelgid, and the Asian longhorned beetle. Devastating nonnative disease pathogens include sudden oak death, chestnut blight, white pine blister rust, and Dutch elm disease. Often the only viable control measure is a preemptive removal of the entire host species within a quarantined area.

Legally harvesting any plant material—even weeds—on managed lands often requires a special use permit. Usually there is no fee, but the permitting process collects useful data such as timing, location, plant species, intended end use of the plant material, and removal and disposal techniques. Obtaining a permit may take anywhere from one week to a month or more, depending on the detail required in establishing mutually agreed upon parameters that ensure compliance with land management laws, rules, and



Patterson Clark, 3 Weed Note, *2009, 11 x 17 inches, artist-made ivy (*Hedera helix*) paper, white mulberry (*Morus alba*) wood block, and* Rosa multiflora *ink. Photo by and courtesy of the artist.*

policies. One extremely important reason for participating in the permitting process is to avoid contact with herbicides. Almost all public and private land managers agree that herbicides are often the only effective treatment in eradicating certain invasive plant species. Some plants even require multiple years of treatment before a population is wiped out. The formal permitting process allows managers to help you identify areas that have not been treated, and to schedule control measures around your harvest.

Laws, control measures, and eradication regimes can vary from plant to plant, from site to site, and from agency to agency. Even if a special use permit is not legally required, establishing contact with the land manager is in everyone's best interest. Managers can help determine sites, allow access to areas that may not be normally available to the public (i.e., via closed roads), and provide plant-specific removal techniques and timing that align with larger ecosystem restoration efforts.

Volunteering for organized weed removal efforts can be an efficient way to obtain large amounts of untreated invasive plant material, but depending on the sponsoring agency or group, a special use permit may still be required for transport and use of the weeds. Establishing contact with the project coordinator well in advance of an event helps to ensure that the targeted plants are available.

When artists incorporate exotics into their work, they establish a beneficial relationship with these plants and may learn to appreciate their positive traits. It is therefore easy to lose perspective on the continued diligence required to minimize the devastating ecological impacts of invasives. Whether for large-scale biomass removal or small-scale individual use, the motivation for using invasive weeds is ultimately to help eradicate these plants from the landscape. This is one natural resource where over-consumption can be indulged, guilt-free.

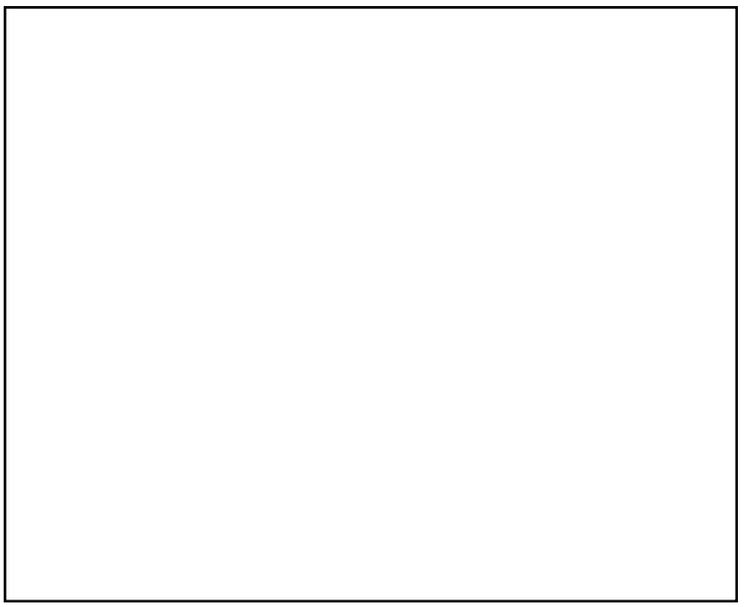
Patterson Clark eloquently terms his woodblock prints, "endless-edition prints (to be printed as long as the plants provide…)." Here's to a lack of source material to turn his prints into limited editions! The year we seek our favorite invasive species and simply cannot find them will be cause for celebration, and an opportunity to reacquaint ourselves with the sustainably diverse and inspiring fibers found in balanced, native plant populations.

NOTES

1. Executive Order no. 13112 on Invasive Species. Federal Register *64, no. 25 (February 8, 1999): 6183–86.*

2. Details of the community-based stream restoration project are available at http://www.stopknotweednj.com.

3. Dave Pimentel of Cornell University's College of Agriculture and Life Sciences, quoted in Erik Lacitis, "In War on Weeds, the Bug Lady Bets on Hungry Weevils," Seattle Times, *August 17, 2006, http://seattletimes.nwsource.com/html/localnews/2003204493_buglady17m.html (accessed October 25, 2009).*



Paper made from Japanese knotweed, harvested April 25, 2009

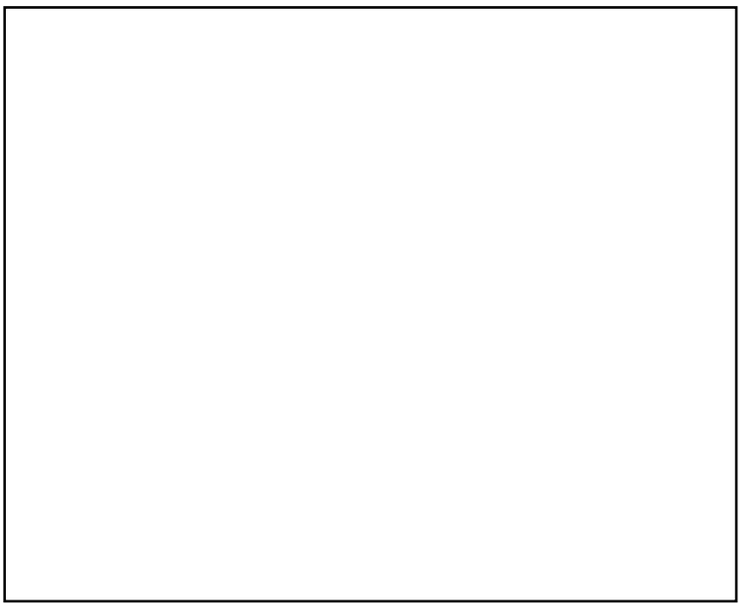
Paper Samples: Comparing Japanese Knotweed Fibers Harvested Three Weeks Apart

JULIE JOHNSON

For these two paper samples, we harvested four- to six- foot tall Japanese knotweed (*Polygonum cuspidatum*) stalks on April 25, 2009 and then three weeks later on May 16, 2009. We processed the plants from each harvest separately using the steps outlined below.

We handled the plant material indoors and disposed the top and bottom ten inches of each stalk and all of the leaves in well-secured, black plastic bags in the trash (not compost). We filled three-gallon stainless steel pots with one-inch pieces of cut stalks, added enough water to cover the plant material, and sprinkled in three ounces of lye to make a 10 percent lye solution. We cooked the knotweed for 45 minutes, then rinsed it thoroughly, and beat the cooked pieces for three hours in a two-pound Mark Lander Hollander beater.

I pulled the paper Western style, waterleaf (no sizing), then wet-pressed the post for half an hour in a hand-crank press, and put the wet sheets under restraint for twelve hours in a drying box. Afterwards I put the dry sheets under weight between smooth boards for a week.



Paper made from Japanese knotweed, harvested May 16, 2009

In comparing the two paper samples, it is clear that the timing of the knotweed harvest can result in widely varying fiber qualities. The April swatch is brown in tone, exhibits high shrinkage, and has a greater translucency than the swatch made from May-harvested fiber. While the April paper is somewhat brittle and tears fairly easily, it holds up well to a fold test, demonstrating the underlying strength of this fiber, even when harvested very early in the season. The May swatch, with its tough, partially unprocessed fiber strands, is more difficult to tear and also holds up very well to a fold test. As the plant matures, the resulting paper becomes more yellow. Knotweed plants harvested after June yield a very tough fiber that becomes increasingly difficult to break down as the season progresses.

While these samples are a good comparative illustration of how harvesting times greatly impact the fiber for papermaking, alas, neither of these swatches truly showcase the excellent paper qualities that knotweed offers. To make a finer quality May paper, I would use a stronger lye solution, a longer cooking time, and/or an extended beating time. However for the sake of direct comparison between these two swatches, I used the same processing steps for both harvests.

To make the Japanese knotweed paper samples, the author Julie Johnson (pictured on left side in lower right photo), Alexandra Schaefers (also pictured in these photos), and Ben Smith harvested and processed the plant material on the Sandy River, near Portland, Oregon. They harvested knotweed stalks that are 3/4 to 1 1/2 inches in diameter and 4 to 6 feet tall. The roots were left undisturbed and 2 to 3 inches at the base of the cut stalks were left intact to aid land managers in locating the plants for eradication. They secured the cut stalks (with leaves intact) in heavy-duty black plastic bags for removal from the site. Japanese knotweed can propagate and create new plants from small stem fragments (in addition to root pieces and seeds), so the plants were processed indoors to ensure 100% containment. The author wishes to thank Russ Plaegar of the Sandy River Watershed Council for his help in locating the untreated knotweed.