

FACTS AND NOTES

Yellow Groove Running Bamboo in Marion, MA and Beyond



Image by Caryn Rickel, Institute of Invasive Bamboo Research, Bugwood.org

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BACKGROUND: [See also video, item #41, for a visual summary of related environmental, economic, and legal issues.](#)

1. **Overview**

- a. **Purpose.** *Phyllostachys* invasive running bamboo is growing in Marion. This document focuses on how plant scientists assess *Phyllostachys aureosulcata*, or “yellow groove” bamboo, and how towns and states regulate it by law. The aim is to protect the plants and properties of Marion.
- b. **Running bamboo.** Bamboo is the fastest growing plant in the world. There are over 1200 species. There are two types: “running” and “clumping.” Running bamboos in the genus *Phyllostachys* spread rapidly in 360° causing environmental and economic damages. The most common species of running bamboo in the Northeast is *Phyllostachys aureosulcata* (yellow groove). All *Phyllostachys* species propagate via roots called “rhizomes” that, at maturity, run out 15-25 feet/year in all directions. New canes, or “culms,” spring up from these rhizomes every year. Yellow groove culms can reach their full height (up to 45 feet) in only eight weeks. A giant temperate timber bamboo from China, *P. aureosulcata* is the most aggressive cold-hardy bamboo.
- c. **Problematic.** Yellow groove rhizomes secrete an enzyme that inhibits other plant growth. Shade canopy is thick, and culm growth is dense. Running bamboo forms a monoculture (see #5 below), choking off native plants. **“I have never seen a species so thoroughly dominate a site and form a monoculture that completely excludes other species.”** Ward, 2011, p.13: http://www.aphis.usda.gov/plant_health/plant_pest_info/weeds/downloads/wra/Phyllostachys_aureosulcata_WRA.pdf. One Senior Certified Research Ecologist (Invasive Plant Research Station) calls yellow groove “a super problematic species.”
- d. **Aggressive and Destructive.** Yellow groove is listed as an invasive species in New York State. A non-native evergreen, it is cultivated as a fast-growing ornamental and privacy screen. *But it has “naturalized” in many states.* Its range covers 32% of the U.S., from Texas to Georgia up through Minnesota to New England. It is adaptive and cold hardy to -15°F. It has the tensile strength of steel. It can grow through asphalt roads (see photos below), into the foundations and sides of buildings, across an entire yard in several years, under stonewalls, over boundaries, and into wetlands or woodlands creating monocultures. See more photos: #17.



- e. **Damage and Law:** The aggressive growth of yellow groove in the Northeast has led to serious environmental and economic costs. These include species diversity (#5) and property values (#16). As a result, *Phyllostachys aureosulcata* is on NY’s “Prohibited Species List” (#30), MD’s “Invasive Species of Concern List,” DE’s “widespread and invasive” list, PA’s “Watch List.” (#33). A NJ law (#31) regulates running bamboo and requires sellers to list its presence for any transaction. **A state law in Connecticut (#29) strictly regulates *Phyllostachys* spp. Over 300 municipal ordinances across the country either regulate or ban running bamboo (#36-43),** including one pending in Attleboro, MA. See “State Agency and Law” below.
- f. **Control:** A weed control specialist (MD Dept. of Agriculture) with 20 years experience advising on the control of running bamboo, concludes: *Phyllostachys* spp. is difficult to control and virtually

impossible to confine.... I personally witnessed two attempts at “barrier confinement” and both failed.... **By far, it is much easier to eradicate than to confine an infestation once established....** Recommendations from this office are to not plant these species.... See #19. <https://drive.google.com/viewerng/viewer?a=v&pid=sites&srcid=ZGVmYXVsdGRvbWFpbnpbnZhc2I2ZWJhbWJvb3Jlc2VhcmNofGd4OmZmMWM5ZGEwZjBhZTM5YQ>. See “Control,” #19, 22-24, 26, and video, #40.

2. **Marion:**

- a. **A local stand** is growing at _____ St. It is now approximately 120 feet long and 40 feet at its widest, with hundreds of culms. It is advancing in all directions, fastest toward the sun to the south.
- b. **E/W/N/SW**. This stand is headed east and southeast into the lawn and pine grove at _____ St. It has invaded west under a fence and stone wall into _____ St., where dozens of culms have already spread. North of the stand by approx. 75 feet is _____ St. To the southwest, rhizomes have been exposed on the boundary line between _____ St. and _____ St. The invasion will reach _____ St. in the Spring of 2015, as rhizomes are poised to grow into that lot’s backyard garden.
- c. **Xxxxxxxx Brook**. Just south of the stand are the banks of Xxxxxxxx Brook, approx. 40 feet away. An invasive species specialist from the UMass Extension Service has visited the site. His conclusion: Given that the leading edge is now in open sun, **the stand will reach the brook’s banks by the summer of 2016**. It will then grow rapidly upstream and down, as yellow groove thrives in moist soils (Prostak, 2014). Upstream is Yyyyyyyyyy Woods (Town property). Downstream is a Sippican Lands Trust property. Note: Rhizomes can cross under the shallow, narrow brook (often not running in summer when rhizomes are growing), invading the lawn at _____. Research (see #12) shows that rhizomes segments can break off and wash downstream where they can re-establish. USDA APHIS 8-20-2012 WRA for *Phyllostachys aureosulcata*, and Rickel, Institute of Invasive Bamboo Research, Nine Known Escapes from Cultivation of *Phyllostachys aureosulcata* in Conn. 2014: <http://presents.bugwood.org/browse/view.cfm?pn=00000189>.
- d. **Criteria, detection, response**. **If this is allowed to happen, yellow groove will have: (1) jumped a “spatial gap” and (2) invaded a natural area or “minimally managed habitat.”** These two points are essential criteria in Massachusetts for listing a species as invasive.* See Appendix. Waiting for this to happen will make eradication extremely difficult and expensive. That is why **Early Detection and Rapid Response (EDRR)** is advocated by the National Invasive Species Council. http://www.invasivespecies.gov/global/EDRR/EDRR_index.html.

**Invasive species* in the Commonwealth are defined as “non-native species that have spread into native or minimally managed plant systems in Massachusetts. These plants cause economic or environmental harm by developing self-sustaining populations and becoming dominant and/or disruptive to those systems.” Massachusetts Invasive Plants Advisory Group: http://massnrc.org/mipag/docs/MIPAG_FINDINGS_FINAL_042005.pdf#page=8.
- e. **Town action**. Marion does not have an ordinance protecting property owners and public lands from the damages of running bamboo. Nor is there an inventory of yellow groove stands in Town. The current Chair of the Conservation Commission knows of at least one other stand. Sales were being made locally up to 20 years ago. **“Facts and Notes” suggests there should be immediate consideration of both an inventory and an ordinance.** In our state, we have a possible model in Attleboro. See #43.

Note: This concludes the Background section. Details that follow include sections on Growth, Risk and Damage, Control, State Agency and Law, and Municipal Ordinances. Of these sections, the reader who is pressed for time is advised to scan items #5, 16, 17 (photos of damage), 19, 22-24, 26, 29, 35, 40 (video), and 43.

GROWTH

3. **Culms.** During its growing season (see #7), a yellow groove culm can grow up to 2 feet per day. The height and thickness of the culms increases each successive year. As noted, maximum height is 45 feet. "A single *Phyllostachys* spp. clump can produce up to 9.3 miles (15 km) of stems [culms] in its lifetime." Gucker, Corey L. 2009. *Phyllostachys aurea*: Fire Effects Information System [online]. U.S. Dept of Agriculture, Forest Service, Rocky Mountain Research Station, Fire Sciences Laboratory (Producer) (footnote 8): www.fs.fed.us/database/feis/plants/graminoid/phyaur/all.html. One forest of yellow groove in Japan covers 10,000 acres. K. Okutomi et. al., "Causal analysis of the invasion of broad-leaved forest by bamboo in Japan." *Journal of Vegetation Science* (Vol. 7, No. 5, pp 723-728), Oct. 1996: <http://onlinelibrary.wiley.com/doi/10.2307/3236383/abstract>.
4. **Rhizomes.** Yellow groove rhizomes are dense and heavy, at 3-30 inches deep. See photos of rhizomes 27"-29" deep here: <https://www.facebook.com/InstituteOfInvasiveBambooResearch>. Rhizomes, not seeds, are the main means of (vegetative) propagation. When mature, yellow groove will "send out rhizomes in all directions from each culm; **rhizomes may extend 15 to 25 feet within a growing season.**" Young & Haun, 1961. *Bamboo in the United States*. p.52; see Nourse photos, 2014. Rhizomes secrete an enzyme that inhibits growth of surrounding plant life. UT Extension. *Phyllostachys* spp. W220 and <http://www.cga.ct.gov/2014/ENVdata/Tmy/2014SB-00072-R000219-R.%20Blake%20Audett-TMY.PDF>
5. **Monoculture.** Bamboo monoculture can be seen in yards, along roadsides and stream banks, in meadows and woodlands. "[B]ecause of extensive vegetative spread, *P. aureosulcata* will eventually form a forest and can impact natural as well as [peopled] areas." USDA APHIS, 2012, WRA (a) cited in: www.nyis.info/user_uploads/6ab45_Phylllostachys.aureosulcata_and_P.aurea.NYS.pdf. "Bamboos can form very dense single-species thickets that displace native plant species and create dense shade that makes it difficult for seedlings of native seedlings to survive." (Swearingen, 2011). Citations above on p.13: http://www.aphis.usda.gov/plant_health/plant_pest_info/weeds/downloads/wra/Phyllostachys_aureosulcata_WRA.pdf. **The state botanist of New Jersey says, "It just out-competes everything."** <http://www.newsworks.org/index.php/local/new-jersey/72750-uncontrolled-growth-of-bamboo-plants-pits-neighbor-against-neighbor>. **A Senior Research Ecologist for the USDA's Forest Service writes, "The 'invasive bamboos' form some of the densest monoculture infestations and present some of the most formidable challenges to contain, control, or eradicate."** <http://www.cga.ct.gov/2012/ENVdata/Tmy/2012HB-05122-R000222-The%20Ecological%20Science%20Society---James%20Miller.%20Research%20Ecologist%20and%20Senior%20Certified%20Ecologist,-TMY.PDF>. See also <https://www.facebook.com/InstituteOfInvasiveBambooResearch/posts/524934270968118> and <http://www.audubon-mas.org/pages/invasives.html> for photographic images.

"These aggressively spreading semi-evergreen plants will take over any sunny or semi-shaded area, forming almost **impenetrable thickets and effectively crowding out all native vegetation**. Due to their aggressive growth habit and ability to overwhelm native habitats, running bamboos have been chosen as the January 2011, Invader of the Month." *Invasive Species of Concern in Maryland, January 6, 2011*: http://www.mdinvasivesp.org/archived_invaders/archived_invaders_2011_01.html).
6. **Naturalization.** **Naturalization is one of two key criteria (there are several more; see Appendix)** for listing a species as invasive in Massachusetts. So it is significant that yellow groove is *not* limited to cultivated stands on private properties. As of 2012, the USDA has documented that *Phyllostachys* has naturalized in 9 states [there are now more]: "IL (Basinger, 2001), PA (DavesGarden, 2012; Kartesz, 2011), WV, TX, GA, AL, MS, (Kartesz, 2011), and KY (NRCS, 2012).... Where naturalized, it appears... to have spread from cultivated sites (e.g., Basinger, 2001)... The exceptions include stands of *P. aureosulcata* in riverine areas along the Susquehanna River in Pennsylvania and next to a bridge abutment in Connecticut... [T]hese are thought to have originated from rhizomes washed downstream from an upstream source (DavesGarden, 2012; Ward, 2012a)." http://www.aphis.usda.gov/plant_health/plant_pest_info/weeds/downloads/wra/Phyllostachys_aureosulcata_WRA.pdf. See also Rickel, 2014: *Nine Escapes from Cultivation of *Phyllostachys aureosulcata**. See <http://presents.bugwood.org/browse/view.cfm?pn=00000189> for photos of naturalization in CT.

7. **Seasonal growth.** “The invasion and damages are continual each year. From July to September rhizomes deeply invade underground, undetected in a 360° pattern around each cane. The bamboo then goes dormant until late April. From late April through June the invasion appears as spikes which shoot off the previous year’s rhizomes. The bamboo is highly destructive and destroys everything in its path. Each successive invasion is more destructive than the previous year’s. The spread is rapid in all directions.” Rickel, 2013. <http://www.cga.ct.gov/2013/ENVdata/Tmy/2013SB-01016-R000315-Caryn%20Rickel,%20CPCU---Institute%20of%20Invasive%20Bamboo%20Research-TMY.PDF>
8. **Water.** Yellow groove grows well in any temperate climate, but rhizomes are especially attracted to the edges of running and standing water: riparian environments, culverts, wells, water lines, sewer pipes, septic tanks, leaching fields, etc. Note: That is why Holmes Brook in Marion is at high risk.

RISK & DAMAGE

9. **Geography.** “Based on three climatic variables, we estimate that about 32 percent of the United States is suitable for the establishment of *P. aureosulcata*.” A USDA map ([see following link](#)) shows that area. It includes all of the mid-Atlantic states and *all of New England* (except the highest elevations in VT, NH, and ME). USDA APHIS. 8-20-2012. *Weed Risk Assessment for Phyllostachys aureosulcata McClure (Poaceae), Yellow groove bamboo:* www.aphis.usda.gov/plant_health/plant_pest_info/weeds/downloads/wra/Phyllostachys_aureosulcata_WRA.pdf
10. **High Risk.** The New York Non-Native Plant Invasiveness Ranking Form assigns *P. aureosulcata* a relative maximum score of 71.43 (70-80 = *High Risk*) if yellow groove escapes controlled cultivation. [See #1e:](#) Yellow groove is prohibited in New York. (Note: NY also prohibits *golden* bamboo, *P. aurea*.) http://www.nyis.info/user_uploads/6ab45_Phyllostachys.aureosulcata_and_P.aurea.NYS.pdf. The USDA APHIS.8-20-2012 analysis ([see #9](#)) for *P. aureosulcata* also yielded a Secondary Screening of *High Risk*.
11. **Establishment and Spread.** “This species’ [i.e. yellow groove] E/S [Establishment/Spread] risk score includes... rhizomes washed downstream from an upstream source (DavesGarden, 2012; Ward, 2012a) [[see #12](#)]... unintentional dispersal by humans (e.g. rhizomes in yard waste), tolerance of above ground mutilation, and a minimum generation time of one year [i.e. maturity is reached quickly]. The uncertainty associated with this element was low. E/S Risk Score = 5 [Very High].... The species has demonstrated an ability to spread beyond areas where it is intended to grow. In our uncertainty analysis, 72% of the iterations resulted in an outcome of High [Risk].” USDA APHIS .8-20-2012. WRA http://www.aphis.usda.gov/plant_health/plant_pest_info/weeds/downloads/wra/Phyllostachys_aureosulcata_WRA.pdf. This Weed Risk Assessment also notes: “The American Bamboo Society [which itself *promotes* bamboo sales] states that “*all running bamboos can become pestiferous.*” ABS, 2008.
12. **Downstream escape.** Segments of *Phyllostachys* rhizomes can wash down waterways to “naturalize” beyond a “spatial gap.” Rickel (2014) has documented nine cases of downstream spread and establishment in Connecticut. *Consider Holmes Brook in Marion.* [This link shows photo evidence in CT:](#) <https://drive.google.com/viewerng/viewer?a=v&pid=sites&srcid=ZGVmYXVsdGRvbWFpbnpbnZhc2l2ZWJhbWJvb3Jlc2VhcmNofGd4OjdhOGRmMTY0ZDY2N2U3MzQ>. Also see: <http://presents.bugwood.org/browse/view.cfm?pn=00000189>.
13. **Human spread.** Snowplows can also spread yellow groove rhizomes. [See photos, Rickel, 2013:](#) <https://drive.google.com/viewerng/viewer?a=v&pid=sites&srcid=ZGVmYXVsdGRvbWFpbnpbnZhc2l2ZWJhbWJvb3Jlc2VhcmNofGd4OjZiMDk3MzJiM2MwMDNhZTQ>. Note: “Researchers suspect that *golden* bamboo may be dispersed by rhizome fragments discarded in yard waste.” Gucker, Cory L. “*Phyllostachys aurea*,” 2009: <http://www.fs.fed.us/database/feis/plants/graminoid/phyaur/all.html>. The same can occur to yellow groove.
14. **Impact potential.** “This species damages sidewalks and driveways, destroys swimming pools, invades septic systems, establishes in lawns, and shades out other vegetation (Rickel, 2012). Many townships have established ordinances restricting the planting and growth of running bamboos, and many of

those specifically target *Phyllostachys spp.* (e.g., Brookhaven NY, 2012; West Bradford PA, 2011) [and dozens more]. This species [as noted above, #5] forms monocultures (Ward, 2011)....”
http://www.aphis.usda.gov/plant_health/plant_pest_info/weeds/downloads/wra/Phyllostachys_aureosulcata_WRA.pdf. For photos of invasive impact, see damage photos, #17, as well as:
www.invasiveplantatlas.org/subject.html?sub=55473 and
<http://www.invasive.org/browse/subthumb.cfm?sub=55473&Start=1&display=60&sort=2>.

15. **Private property.** "I have personally seen landscapes where this plant has taken over the whole yard." Lemke, 2008. The Institute of Invasive Bamboo Research in Connecticut has documented over 600 yellow groove infestations in CT alone, mapping over 300 of these. See [Early Detection and Distribution Mapping System: eddmaps.org](http://www.eddmaps.org/). <http://www.eddmaps.org/profile.cfm?user=2610>. In addition to the damages noted (#14), *Phyllostachys* is also known to invade and harm: gardens, stands of trees and shrubs, crawl spaces and foundations, the walls of garages and houses, patios, stone walls, roads, pipes, wells, underground sprinkler systems and utilities, gas lines. Says one homeowner: "It's a very destructive plant... if you look at our neighbor's property *there's no grass, just bamboo*." http://www.delconewsnetwork.com/articles/2011/07/21/news_of_delaware_county/news/doc4e25f55348014772716288.txt?viewmode=2. See also damage photos, #17.
16. **Property values.** Cases across the Northeast and beyond demonstrate that bamboo invasions can constitute a "**property stigma**." Abutting stands can constitute an "**external obsolescence**." <http://www.nhregister.com/general-news/20120218/yellow-groove-bamboo-an-annoyance-to-some-connecticut-homeowners-questions-on-whether-or-not-it-is-invasive>. **Values can plummet and resale can become difficult to impossible.** *Real estate agencies are so noting:* "The problem with bamboo is that most varieties found in the US are "running bamboos" that are very difficult to control.... Once established, bamboo is almost impossible for the non-professionals to eradicate and can take over a yard in just a few years. Because **bamboo does not respect lot lines it can easily spread to neighboring yards**. In addition bamboo roots can be very damaging to sidewalks, other plants, driveways and even foundations. Quite frankly, **there is absolutely no reason to plant bamboo in your yard, and educated consumers will shy away from buying a home when bamboo present. If you have bamboo in your yard and are thinking of selling your home then I think it is a good idea for you to start working on getting rid of the bamboo....**

"You might put your home on the market in the hopes that you will find a buyer that does not care or is poorly informed about bamboo. However, **be warned that real estate agents are themselves becoming more informed about invasive plants such as bamboo**. As a good buyer agent, I make sure that I have a frank talk with my clients when we discover a home that has established bamboo in the yard. **Simply put, these days the presence of bamboo around your home (even if it is in your neighbor's yard) is a "red flag" and can greatly affect the value of your home.**" "How Not to Sell Your Home... Plant a Little Bamboo," Ross Sutton (real estate), MD: <http://blog.rosssutton.com/blog/sell-home-plant-little-bamboo/>.

In Connecticut there are three separate confirmed Property Tax Assessment Appeals for stigmatized market value due to *Phyllostachys* invasive running bamboo. [Rickel, 2014 \(3 cases granted on file\)](#).

17. **Public property.** Of the 600 occurrences of yellow groove documented in Connecticut, approximately "one-third have escaped to natural areas and wetlands" (Rickel, 2014) as well as to "parks, preserves and open space." <http://www.eddmaps.org/distribution/usstate.cfm?sub=55473>. Roads are not immune. Yellow groove will grow right through asphalt. See [damage photos, public and private property, Rickel: https://sites.google.com/site/invasivebambooresearch/classroom-pictures](#).

CONTROL

18. **Multiple approaches.** As below, several techniques have been used to try to control, contain, and eradicate running bamboo. Note: The only sure way to eliminate *Phyllostachys aureosulcata* is to remove all rhizomes. The American Bamboo Society agrees (see #26). The evidence follows:

19. **The difficulty.** From Mark J. Smith, Administrator of Weed Control, Plant Protection and Weed Management Section, Office of Plant Industries and Pest Management, MD Dept. of Agriculture:

Invasive Bamboo (*Phyllostachys spp.*)... is difficult to control and virtually impossible to confine. I have been making recommendations for the control of *Phyllostachys spp.* for the past 20 years and have arrived at some understanding as to the difficulty of either effort. **By far, it is much easier to eradicate than to confine an infestation once established.** [See #26.] Recommendations from this office are to *not* plant these species....

...I have personally witnessed two attempts at “barrier confinement” in much smaller infestations and both failed. [See #23, 24.] Bamboo planted and maintained in *above ground containers with concrete surfaces* adjacent and underneath would suffice to contain the plant, but this is conjecture.

My expertise as Administrator of Weed Control is efficacious control of problematic weeds. For some, such as *Phyllostachys spp.*, chemical or herbicidal control is the only viable option once these infestations have grown into the environment....” [U]nfortunately all [herbicides] have some **detrimental or deleterious aspects**.... Any application would not be successful if only a portion of the problem is treated. (This would be akin to treating one room in a house for bedbugs.) Application would need to go on the entire infestation, and then need to be done more than once. *It will require several applications over several years*.... Smith, 2011 (emphasis added).

<https://drive.google.com/viewerng/viewer?a=v&pid=sites&srcid=ZGVmYXVsdGRvbWFpbnpbnZhc2l2ZWJhbWJvb3Jlc2VhcmNofGd4OmZmMWM5ZGEwZjBhZTM5YQ>.

20. **Prohibited vs. regulated.** New York, a state that has already prohibited yellow groove (see #30), distinguishes between *prohibited* and *regulated* in this typical language: “*Prohibited* invasive species cannot be knowingly possessed with the intent to sell, import, purchase, transport or introduce. In addition, no person shall sell, import, purchase, transport, introduce or propagate prohibited invasive species. *Regulated* invasive species, on the other hand, are species which cannot be knowingly introduced into a free-living state, or introduced by a means that one should have known would lead to such an introduction, although such species shall be legal to possess, sell, buy, propagate and transport.” http://www.dec.ny.gov/docs/lands_forests_pdf/isprohibitedplants2.pdf. See also “State Agency and Law” below.
21. **Prevention.** Prohibited species lists and certain town ordinances ban importing, selling, and/or planting running bamboos. “Do not plant exotic bamboos.” Jill Swearingen, *National Park Service, Plant Invaders of Mid-Atlantic Areas*, 2010. Similarly: “**Do not plant running bamboo. There are trees and shrubs that can be used as alternatives for screens and ornamental effect.**” “*Invasive Species of Concern*,” The Maryland Invasive Species Council, 01/06/11.
22. **Early Detection and Rapid Response.** The National Invasive Species Council writes: “While prevention is the first line of defense, even the best prevention efforts will not stop all invasive species. Early detection and rapid response (EDRR) efforts increase the likelihood that invasions will be halted and eradicated. Once a species becomes widely established, the only action possible is the partial mitigation of negative impacts.” In addition: “The detection of an invasive species initiates the Rapid Assessment process [that may] recommend a response.... *In addition, assessments of potential invasions can be conducted in advance of their detection.* The rapid assessment process is an essential aspect of timely EDRR. http://www.invasivespecies.gov/global/EDRR/EDRR_index.html.”
23. **Containment overview.** Some towns with ordinances allow bamboo in above-ground pots. Otherwise: **Mowing** does not stop shoots from coming up from the rhizome network for years. http://www.nyis.info/user_uploads/6ab45_Phyllostachys.aureosulcata_and_P.aurea.NYS.pdf. Anecdotal evidence indicates that cutting all culms to “**carbohydrate starve**” a stand makes the rhizome network expand at about twice the original rate. Rogan, 2014. **Severing rhizomes spreads** growth. Plastic, metal, and concrete **barriers** deteriorate (see #24) and eventually fail. **Trenching** (without a barrier; “**dry moats**”) around stands to expose and prune rhizomes requires ongoing maintenance (humans

err, properties change hands). Trenching is problematic around obstacles and boundaries. Falling accidents can occur. Rhizomes can pass through air to find soil on the other side. The American Bamboo Society acknowledges that **chemicals** pose an undue risk and should *not* be used. See #26.

24. **Barriers.** According to the Maryland Invasive Species Council: **“Root barriers that physically prevent roots from growing and spreading are not fool proof and are not easy to install.”** [They add: “Trying to grub out [remove with hand tools] running bamboo, unless it’s in very small patches, is usually futile. Leaving one small piece of the rhizome in the ground is enough for the bamboo to start growing all over again.”] http://www.mdinvasivesp.org/archived_invaders/archived_invaders_2011_01.html.

Note: Rhizomes burst through plastic barriers. “Metal rusts out,” says the American Bamboo Society. Concrete barriers crack. Constructing barriers near buildings, through stone walls, and around trees is complicated. Rhizomes get entangled in the roots of trees. Rogan, 2014. Experience shows that barriers may do nothing for a would-be buyer’s application for a mortgage given increasingly wary bankers. There is too much experience with barriers failing: <https://drive.google.com/viewerng/viewer?a=v&pid=sites&srcid=ZGVmYXVsdGRvbWFpbnpbnZhc2l2ZWJhbWJvb3Jlc2VhcmNofGd4Ojc1YTg3YmZkNjgxZGM2YTU>. One Pennsylvanian homeowner concluded that rhizome barriers were the only solution. But then she found that: **“Barriers must be professionally installed to a depth of about 30 inches, at a cost [in 2011] of about \$1,000 per 30 feet.*** It’s very expensive and very few landscapers want to handle it. It would mean taking down our fence and putting in a barrier on our dollar, then putting the fence back. The barrier has to be 6-12” from the fence.” http://www.delconewsnetwork.com/articles/2011/07/21/news_of_delaware_county/news/doc4e25f55348014772716288.txt.

***Note: The perimeter around the stand at _____ St. and _____ St. in Marion is ~360 feet minimum. Say the price per 30 feet in 2015 dollars, and given obstacles (stonewall, trees, proximity to buildings) is \$1,200. Total cost: approx. \$14,400. The cost of barriers would be about the same as eradication. See #26.**

25. **Herbicide.** Experience treating bamboo with the glyphosate (Roundup) shows some effect, though spotty. It must be used repeatedly over years. “*Cut stump* treatments are also likely to require multiple visits, as single applications do not tend to effectively control this species.” Czarnota and Derr, 2007. There are prodigious stores of energy in the massive network of rhizomes supporting a large stand. Note: While it is true that Roundup binds to the soil, it is also true that birds, fruits, and vegetables are in the affected area. Roundup is “toxic to human DNA even when diluted to concentrations 450-fold lower than used in agricultural applications.” *Archives of Toxicology*, Feb 2012. Roundup is also linked to cancer: <http://www.collective-evolution.com/2013/06/14/groundbreaking-study-links-monsantos-glyphosate-to-cancer/>.
26. **Eradication.** Excavation and incineration has emerged as the best solution. The [American Bamboo Society](#) itself states: **“If you must remove unwanted bamboo, the only truly effective way to get rid of it is to dig it out. The ABS does not recommend using chemicals to kill bamboo because of the potential for environmental damage from ground and water contamination and the potential for contact with humans and animals. If you inherit a “problem” bamboo, the fastest and most cost-effective means of removing it or managing it is to hire someone with expertise to assist you.”** <http://nccabs.org/Invasiveness.php>. (cont.)

“Dennis Rogan runs a small company in Bozrah, CT, that started doing excavation jobs to remove bamboo about three years ago [2011]... To get rid of the bamboo, Mr. Rogan and his team begin by cutting down all the canes. Then, using a backhoe, they dig out the root structure, which can extend several feet beneath the surface depending on the maturity of the bamboo. They sift the roots from the soil, then take them to an incinerator to make sure those roots don't spread again.” J. de Avila, “Bamboo Battle Spreads: New Laws impose Fines – Even Jail Time...,” *Wall St Journal*, 9/3/13: <https://drive.google.com/viewerng/viewer?a=v&pid=sites&srcid=ZGVmYXVsdGRvbWFpbnpbnZhc2l2ZWJhbWJvb3Jlc2VhcmNofGd4OjExYzhmYWwEwMjcxNTliNWU>. Note: Mr. Rogan has done about six jobs a year since

2011, ranging from \$3,000 to \$15,000.* He claims 100% success. [Nourse, 2014](#).

Wall Street Journal article above: “Mr. Velez, [a] homeowner in Colonia [NJ], found no easy answers for removing the bamboo. The estimates he has received to excavate his backyard to remove the bamboo canes and their roots... range from \$3,500 to \$10,000.”*

***Note:** Again, the case at _____ St. and _____ St. is especially complicated given boundaries, a stone wall, proximity of buildings and wetlands, and the roots of large trees. “It’s a mess.” [Steve Gonsalves, 2014](#). The cost of excavation will almost certainly be on the higher side.

STATE LAW & AGENTS

27. **Invasives list vs. State law.** A state’s invasive species council determines invasive status. Each state has its own definitions, criteria, and procedures. [For Massachusetts, see Appendix](#). A plant on the prohibited list cannot be sold in a nursery, etc. A state law, prompted by legislators and constituents, can declare a species a nuisance, regulate or ban its planting, and require fines and damage payments. [See #29](#). (One town ordinance includes the possibility of jail time. [See #40](#).)
28. **Massachusetts Invasive Plant Advisory Group.** See Appendix for the state charge of MIPAG.
29. **Connecticut.** Effective October 1, 2013, this law “makes people who plant, or allow running bamboo to be planted on their property, liable for any damages caused to a neighboring property. That liability includes the cost of removing the plant, which can run into the thousands of dollars.” <http://bigstory.ap.org/article/conn-bamboo-planters-could-face-legal-liabilities>. The language of the law: <http://www.cga.ct.gov/2013/act/pa/2013PA-00082-R00SB-01016-PA.htm>. Some municipal ordinances in Connecticut are stricter than the state law. [See Orange, CT \(banned from planting\): http://ecode360.com/28393225?highlight=bamboo#28393225](#).
30. **New York.** The state lists both *Phyllostachys aureosulcata* and *P. aurea* (golden) as *prohibited*, not merely *regulated*, on its Invasive Plants List. Note: Massachusetts could also consider official action on *both* running bamboos. NY list: http://www.dec.ny.gov/docs/lands_forests_pdf/islist.pdf. The same list with photos: http://www.dec.ny.gov/docs/lands_forests_pdf/isprohibitedplants2.pdf.
31. **New Jersey.** “A person who plants running bamboo or who allows running bamboo to grow on the person’s property shall not allow such running bamboo to grow beyond the boundaries of the property. A person who violates this subsection shall be liable for any damages caused to any adjacent property by the running bamboo, including, but not limited to, the cost of removal of any running bamboo that grows on to the adjacent property.” http://www.njleg.state.nj.us/2014/Bills/A3500/3452_R3.PDF.
32. **Maryland.** All running bamboo species (*Phyllostachys* spp.) are on the MD Invasive Species of Concern list.
33. **Delaware.** The state’s Invasive Plant Lists labels several species of *Phyllostachys* running bamboos as “widespread and invasive,” including *P. aureosulcata*. Further: “Plants on Delaware’s Invasive Plant List were chosen by a committee of experts in environmental science and botany, as well as representatives of State agencies and the Nursery and Landscape Industry. An environmental assessment was conducted on each of the plants listed, and placement on the list results *from review of the scientific literature*, as well as a consensus of expert opinion. *Plants on the list should not be planted, under any circumstances, and should be removed from properties as feasible. Listed plants that are currently in the nursery trade should be phased out of inventory and production.*” http://dda.delaware.gov/publications/plant_industries/DEInvasPlntBklt.pdf.

34. **Pennsylvania.** Yellow groove is on the “Species Watch List.” That is, the species has the potential to “act aggressively...and could pose threats to the natural ecosystem, if they become invasive.” http://www.dcnr.state.pa.us/cs/groups/public/documents/document/dcnr_20026634.pdf.
35. **Virginia.** “[T]he Virginia Supreme Court has ruled that ‘deliberate growers of destructive, invasive plants can be held liable by their neighbors for damages and removal.’” **That is, in Virginia a civil suit can be filed regardless of the existence of a state law or municipal ordinance specific to bamboo.** http://www.delconewsnetwork.com/articles/2011/07/21/news_of_delaware_county/news/doc4e25f55348014772716288.txt?viewmode=2. and http://internet.chadwickwashington.com/jsp/content/resources/Update_Regarding_Virginia_Tree_Case_revised.pdf. The same is true in Massachusetts given “nuisance” laws, as follows:
36. **Massachusetts.** The Commonwealth does not (yet) list *Phyllostachys aureosulcata* on the state’s prohibited list of invasives. Nor is there a state law regulating the use of yellow groove. However: “Activity of one property owner or resident that may cause harm to or otherwise adversely affect the property of another, such as a neighbor’s property, may give rise to a private remedy under the **nuisance laws of the Commonwealth**. In general, private nuisance laws provide that an individual may bring a private action for nuisance where a neighbor caused a substantial and unreasonable interference with the use and enjoyment of the property of the person whose property has been adversely affected by the nuisance. **Vegetation encroachment in some instances has been considered to be a nuisance.**” *City Solicitor, Cambridge, MA, 11/21/11.*

In Attleboro: "While not presently a township code violation [an ordinance initiative will be acted on in 2015; see #43], property owners should check with their attorney to see what civil costs may be collected by a neighbor that has to incur expense or suffer property damage as a result of planting an invasive (running) species of bamboo rather than a species that grows in a clump and does not spread." *Lori Hanlon-Widdop, Assistant Township Manager and Codes Director, Attleboro, 2014.*

MUNICIPAL ORDINANCES

37. **Lists.** Running bamboo has been declared a nuisance, and bamboo ordinances have passed one after another in the past several years in NY, CT, PA, NJ, DE, MD and beyond. Some can be found here: <https://sites.google.com/site/invasivebambooresearch/classroom-news/bambooordnances>. **The Institute of Invasive Bamboo Research states that there are over 300 municipal ordinances across the U.S.**
38. **Brick, NJ.** At least one township has found some ordinances don’t go far enough. The Brick Township Council passed an **ordinance in 2011 regulating running bamboo**. However, “‘property owners... have had some serious problems and have not been able to remedy them because our ordinance was not really effective,’ said Council President Susan Lydecker.” So in October **2014** the Council voted unanimously to pass a **new ordinance that banned running bamboo outright**. <http://brick.shorebeat.com/2014/10/bamboo-invasive-plant-ban-passes-in-brick/>.
39. **Ocean City, NJ.** “City Council on Thursday approved an ordinance that prohibits the planting of bamboo in Ocean City and requires owners of properties with existing bamboo to pay to remove it from neighbors’ properties if it spreads.” Note: **“Residents said bamboo removal costs easily can reach \$10,000.... They said the only truly effective way is to dig several feet deep, displacing all landscaping and hardscaping, to uproot all bamboo rhizomes.”** <http://ocnjdaily.com/ocean-city-gives-final-ok-to-bamboo-ban/>.
40. **Newtown, CT.** A model: Three excerpts from Newtown’s ordinance (July 2014) read as follows:
- “Section 3.** No person or legal entity shall plant or cause to grow Running Bamboo on any property within the Borough of Newtown unless done so pursuant to plans for containment designed by, and signed and sealed by a licensed arborist or forester and approved by the Borough’s **Tree Warden** or

appointed official, which plans shall provide, in the opinion of the Borough official, for an effective barrier to prevent the spread of such Running Bamboo to any land within 40 feet of the property boundary on which it is to be planted or grown.

“Section 4. Any Running Bamboo that is planted or otherwise permitted or allowed to grow on any property within the Borough, whether such running Bamboo existed before or comes into existence after the effective date of this ordinance shall not: (A) be planted, maintained or otherwise be permitted to exist within forty (40) feet of the traveled portion of any public street or sidewalk or within forty (40) feet of the boundary of the property on which it exists, (B) be permitted or suffered to encroach or grow upon any adjoining or neighboring property, including all public property and rights of way.

“Section 5.A. Each Bamboo Owner shall be responsible for ensuring that any Running Bamboo on property owned or occupied or controlled by him or her does not violate the provisions of this ordinance and for ensuring that Running Bamboo that originated on property owned, occupied or controlled by him does not invade neighboring or adjoining properties. If it is determinable, by a fair preponderance of the evidence, that running bamboo has infringed on the property of abutting property owners, the originating Bamboo owner shall be responsible for removal and remedy of said Running Bamboo infringement. Failure to remove and remedy shall be violation of this ordinance.”

In the case that owners do not “remedy,” the Town reserves the right to take action and to charge the owner for same – and to charge offenders for repeat offenses up to \$100/day of continuing violation.

41. **Malverne, NY.** The May 2013 ordinance bans “the planting or growing of bamboo. Violators [can] be fined up to \$350 or be subject to up to 15 days in jail.” Rose Valley, PA also has an incarceration clause in its ordinance. J. de Avila, “Bamboo Battle Spreads, New Laws Impose Fines—Even Jail Time—for Cultivation of Fast-Growing Plant,” *Wall St Journal*, 9/3/13: <http://www.wsj.com/articles/SB10001424127887324463604579045512215663836>. Full text reprinted here: <https://drive.google.com/viewerng/viewer?a=v&pid=sites&srcid=ZGVmYXVsdGRvbWFpbnpbnZhc2l2ZWJhbWJvb3Jlc2VhcmNofGd4OjExYzhmYWUwMjcxNTliNWU>. Also: **Video showing damage in Malverne, NY:** <http://landing.newsinc.com/shared/video.html?freewheel=90733&sitesection=repam&VID=24790045>. See #43.
42. **Huntington, Long Island, NY.** The April 2013 ordinance requires “property owners to remove bamboo from their property or face potential monthly fines of between \$250 and \$500.” See #40: *WSJ*, 9/3/13.
43. **Dover, DE.** The Dover “City Council voted 7-0 to approve the ordinance... based on a number of complaints made by city residents about the highly invasive, Asian plant. Under the new law, it is unlawful to plant or grow bamboo on any city parcel unless the root of the bamboo is entirely contained within an above-ground-level planter, barrel or other vessel.” <http://bugwood.blogspot.com/2012/07/invasive-bamboo-outlawed-in-dover.html>.
44. **Attleboro, MA.** Attleboro is working on an ordinance now that would ban or regulate yellow groove. The effort has the support of the Conservation Commission. According to the Attleboro Conservation Agent: “It’s a horrible invasive species. Once you plant it, it’s very hard to contain. It can undermine foundations, tear up sidewalks, and rupture gas lines. It will take over.... People see it and think it’s pretty and plant it. But they’re not aware of what they’re getting into. It’s just a matter of time before it takes over. It’s a very strong, aggressive species.” **Video News Report (6:53) on the Attleboro initiative, Double ACS [TV] News:** <https://www.youtube.com/watch?v=4ppOZa9dsjY&index=45&list=PLE64B1DF53E97CEEA>

APPENDIX: Massachusetts Invasive Plant Advisory Group

<http://www.massnrc.org/mipag/> [http:// 4/1/05](http://4/1/05)

MIPAG was charged by the Massachusetts Executive Office of Environmental Affairs to provide recommendations to the Commonwealth regarding which plants are invasive and what steps should be taken to manage these species....

MIPAG defines invasive plants as *non-native species that have spread into native or minimally managed plant systems in Massachusetts, causing economic or environmental harm by developing self-sustaining populations and becoming dominant and/or disruptive to those systems.*"

For a species to be designated as 'INVASIVE,' 'LIKELY INVASIVE,' or 'POTENTIALLY INVASIVE,' it must meet certain base criteria (#1-4 below). The species must:

1. Be nonindigenous to Massachusetts.
2. Have the biologic potential for rapid and widespread dispersion and establishment in minimally managed habitats
3. Have the biologic potential for dispersing over spatial gaps away from site of introduction.
4. Have the biologic potential for existing in high numbers away from intensively managed artificial habitat"
5. Be naturalized in Massachusetts (persists without cultivation in Massachusetts).

If a species meets Criteria 1-4 and Criterion 5, it may be considered "INVASIVE " or "LIKELY INVASIVE" in Massachusetts. Go to Criteria 6-9. If it does not meet Criterion 5, it may be considered "POTENTIALLY INVASIVE" if it meets Criteria 13-15.

6. Be widespread in Massachusetts, or at least common in a region or habitat type(s) in the state.
7. Have many occurrences of numerous individuals in Massachusetts that have high numbers of individuals forming dense stands in minimally managed habitats.
8. Be able to out-compete other species in the same natural plant community.
9. Have the potential for rapid growth, high seed or propagule production and dissemination, and establishment in natural plant communities.

If a species meet the initial five Criteria and Criteria 6-9 it may be considered a "INVASIVE" species in Massachusetts. If a species meets the initial five Criteria, but does not meet all of Criteria 6-9 at this time, it may be considered a "LIKELY INVASIVE" species in Massachusetts if in addition it meets at least one of the following three Criteria (#10-12).

10. Have at least one occurrence in Massachusetts that has high numbers of individuals forming dense stands in minimally managed habitats.
11. Have the potential, based on its biology and its colonization history in the Northeast or elsewhere, to become invasive in Massachusetts.
12. Be acknowledged to be invasive in nearby states but its status in Massachusetts is unknown or unclear. This may result from lack of field experience with the species or from difficulty in species determination or taxonomy.

If the species meets the basic criteria for invasiveness (Criteria 1-4) but is not naturalized in Massachusetts (Criterion 5), the species may be considered "POTENTIALLY INVASIVE" in Massachusetts if it meets the following three criteria (#13-15):

13. The species, **if** it becomes naturalized in Massachusetts, based on its biology and biological potential, would pose an imminent threat to the biodiversity of Massachusetts, and
14. Its naturalization in Massachusetts is **anticipated**, and
15. The species has a documented history of invasiveness in **other areas of the Northeast**.

END OF DOCUMENT