



WEED MANAGEMENT WITHOUT SYNTHETIC CHEMICALS



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WHY?

“As is typical with most dichotomies, “native” and “invasive” are overly simplistic and judgmental.”

“Believe me, I am all in favor of preserving native remnant patches, and if you can connect them up with each other, that’s all the better.”

– Peter Del Tredici, Former Senior Research Scientist, Arnold Arboretum



Iraqi Marshlands
Observation System
UNEP Technical Report



WHY DO WE CONTROL INVASIVE PLANTS?

In the Middle East,
Phragmites is native &
used to clean sewage
blackwater

The paradigm shifts,
depending upon nativity
& point of view

THERE IS NO SUCH THING AS A “BAD” PLANT!

Plants are opportunists
and grow where they can

It's not the plant; it is us

WE are the most invasive
species on the planet

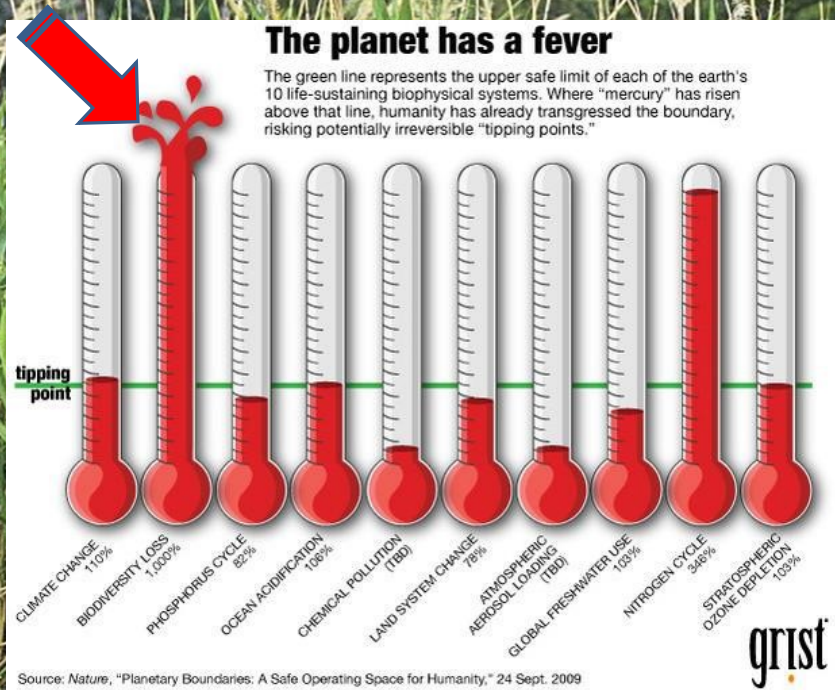


WHY?

“All plants are not created equal, particularly in their ability to support wildlife.
... My central message is unless we restore native plants to our suburban ecosystems,
the future of biodiversity in the United States is dim.”

- Douglas W Tallamy

WHY CONTROL INVASIVE PLANTS?



WHY?

“In minimally managed areas, invasive plants crowd out native plants. The presence of invasive plants alters the way plants, animals, soil, and water interact with native ecosystems, often causing harm to other species in addition to the plants that have been crowded out.”

CT Invasive Plant Working Group (CIPWG)



WHY?

**INVASIVE PLANTS CAN LIMIT OR PREVENT
ACCESS TO LAND**

**WE & OTHER CREATURES WE SHARE THE PLANET WITH
GET CROWDED OUT**

HOW?

Learn the personalities of the plants by keen observation and understanding of natural processes.

Think differently. Experiment. New strategies.

ACHILLES' HEEL HYPOTHESIS

Most Plants Have An Inherent Weakness
Discover & Exploit

Annual, biennial, perennial

Herbaceous or woody

Vine, shrub or tree

Cultural preferences

Phenology

Growth habit



TIMING & ATTENTION TO DETAIL ARE MOST IMPORTANT FACTORS



Reed Canary Grass



Japanese Stiltgrass

IMMATURE PLANTS



Nutsedge

INVASIVE PLANT REMOVAL

- Physical removal results in the most site disturbance; cut at soil line instead
- Remove plants that spread by seeds before the flowering (or fruiting) period
- Removing woody plants in early Spring can be difficult because of bark slippage (fresh cambium)
- Begin where least invasion has occurred and work inward
- Learn specific techniques & timing for each species

AIR SPADE



Root Removal In Sensitive Areas



- Exposes roots with minimal harm to desirable vegetation
 - Works best on young or shallow-rooted plants
 - Aegopodium, Artemesia, Ranunculus
 - Damages soil biology

GIRDLING

- This Norway maple was growing adjacent to a meadow restoration site and supported an almost solid groundcover of Norway maple seedlings
 - Allelopathic? *“Despite the wide range of experimental conditions, no evidence of growth interference by allelopathy by Acer platanoides was detected. Though these experiments do not completely eliminate the possibility of allelopathy occurring, they do demonstrate that any allelopathic affect on plant growth is probably very small.”*
- Rich & Kilham, Drexel University 2004



“A snag in an intact forest can be 5-10 times more productive than a living tree.”
- Sara Stein – Noah’s Garden

SUNLIGHT MANAGEMENT

Invasives Removed & Desirable Vegetation Salvaged
& Replanted To Shade Out Resprouts



Summer 2012

Summer 2013



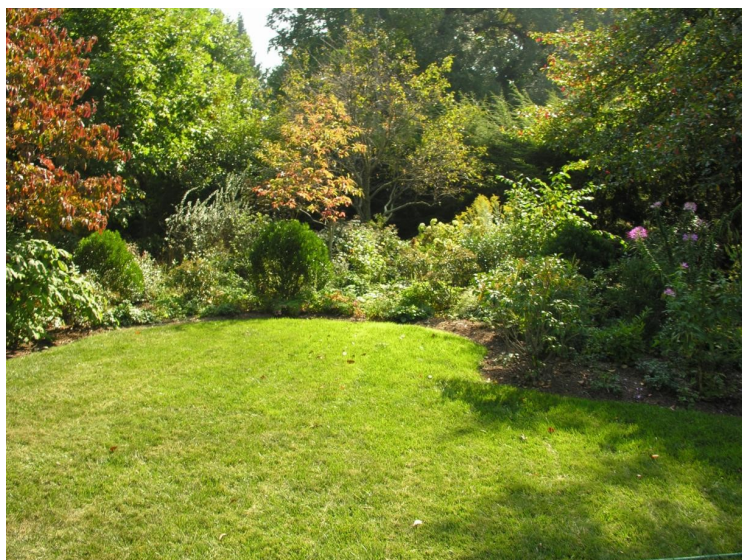
MANAGING SUNLIGHT

Cornus racemosa Along Ecotone



MANAGING SUNLIGHT

After Phragmites Removal – 1 Year



SMOTHER CROPPING

Using Plants To Control Plants

BUCKWHEAT



BUCKWHEAT

- Weaken weeds by mowing or use an organic herbicide
- Remove vegetative debris to expose soil
- Sow Buckwheat at 75 pounds per acre (1.75 lb/1000 sq. ft.)
- Rake in to provide adequate seed-to-soil contact
- Germinates quickly – 5 days +/-
- Completely shades the ground with a shingle-like leaf arrangement
- Mow off flowers to avoid self-sowing, unless desirable in Year 2
- Completely winterkills
- May require multiple seasons to control toughest plants



PRESCRIBED FLOODING
Using Water to Control Weeds

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WATER AS “HERBICIDE”

Mosquito Breeding in Periodically Inundated Zone Close To Pool Area

Wetland Soils Present (CT) - No Herbicides Allowed



Seal Leaks With Bentonite Clay

Flood With Hydrant for Five Weeks



DEWATERING

Note the Dirt Bag Used to Filter Sediment



Drowned Vegetation Ready for Planting

Boulders Set at Varying Elevations for Amphibian Perch Habitat



Wetland Habitat



TIMED & TARGETED MOWING OR CUTTING

- Buys time; timing is very important
- Cutting weeds at ground level minimizes soil disturbance (weed seed)
- Mow or cut often, leaving desirable vegetation to shade out weeds
- Allows desirable vegetation to reestablish & increase vigor
- Results in control, not eradication



MAY & JUNE MOWING

Meadows: two mowings – May & June
– multiflora rose, blackberry, etc.
Sets back cool-season grasses,
Canada Goldenrod, Etc.

“RELEASED”
Asclepias tuberosa



-RI

PREVENTING SEED PRODUCTION



Lonicera morrowii

Berberis thunbergii



Euonymus alatus

Rosa multiflora



WHEN YOUR CLIENT WON'T LET YOU REMOVE THEM ...

... REMOVE THE FLOWERS

Know When Plants Set Flower Buds

- Woody plants: Barberry, Honeysuckle, Burning Bush, etc., set buds on last year's growth; herbaceous plants: Black Swallowwort, Mile-A-Minute, Mugwort, etc., flower on current year's growth
- Asexual reproduction occurs from root suckers & layering of branch tips, so remove arching branches & root suckers
- Cardboard & mulch may reduce root suckering



BIOLOGICAL CONTROL

Purple Loosestrife Beetle
Galerucella californiensis

Purple Loosestrife Beetle
Galerucella calmariensis
European defoliator



HOW TO USE PURPLE LOOSESTRIFE BEETLES

REAR YOUR OWN

- Contact County Extension Offices for local instructions & beetle sources
- Plant loosestrife root crowns in 5-gal buckets; secure foliage with mesh
- Infest plants in May with 20-25 beetles per bucket (400-600 new beetles)
- Release infested plants in July in sunny infestation area, 1 bucket/square yard
- Leave for 2 months to allow larvae to mature, then destroy host plants
- **Results in control, not eradication** *“It is not in the interests of a biocontrol agent to kill its host because then it loses its food so it tends to just suppress it.”*
- - Dick Shaw, The Guardian
- **Interstate transport of biological control agents is illegal without permit**
- www.bio-control.com sells 100 adult beetles for \$150.00
-

A BIOCONTROL FOR JAPANESE KNOTWEED?

Aphalaris itadori, a sap-sucking psyllid

First biocontrol agent in UK – 2010

Being trialed in America - 2013
(MA, VT, NH)

Will they establish, overwinter,
behave?

Stay tuned ...



The sap-sucking bug
or psyllid, *Aphalara*
itadori, stunts the
growth and spread of
Japanese knotweed

ANIMAL GRAZING TO CONTROL WEEDS

Goat grazing is a long-term commitment and can influence the site in positive or negative ways: herbivory, physical impact, fertility

- Some plants are poisonous to goats: black cherry, VA creeper, pokeweed ...
- Must be protected & contained
- Hire a professional goatherd
- Steep, rocky & remote terrain
- Animals “taught” to eat weeds pass along that knowledge to herdmates
- UVM
- Some goatherds specialize in control of invasive plants





... and they are so darn cute!

Sharesloth.com

- Goats eat some, but not all, roots
- Seeds are destroyed by chewing & digestion
- Plant thickly with “thug” plants when grazing is complete

ORGANIC HERBICIDE INJECTION



JAPANESE KNOTWEED WITH JK INJECTION GUN & 30% HORTICULTURAL VINEGAR

Utilizes The Plant's Capability To Transfer
Nutrients From Stems Into Roots In Fall

- Mow 3 times, May – July to weaken
- Leave 1 plant unmown as indicator
- When flowers begin to fade, but not setting seed, inject between 2 lower nodes until full; use a marker dye
- Repeat yearly (2+ years)
- Timing is crucial



SECRET SAUCE RECIPE

FOR EVERY GALLON OF VINEGAR, ADD:

1 Ounce Dish Soap

1 Quart Citrus Oil

1 Cup White Salt Flour (NOT Sea Salt)





JAPANESE STILTGRASS

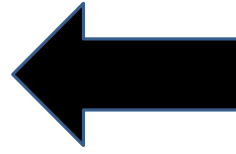
JAPANESE STILTGRASS

Microstegium viminium

- Annual lifecycle (Achilles' Heel?)
- Each plant can produce up to 1000 seeds
- Seeds can remain viable for up to 7 years
- Proper I.D. - looks like *Leersia virginica*, a native woodland grass
- Reflective strip along midrib, stilt roots, easily pulled out
- Manual removal, scalp mowing, organic herbicide
- Initiate control in mid-summer but before seed is set
- Seeds will germinate but not mature before they are winterkilled
- Will set seed at ½" in height, so don't mow too early
- Propane torch – burn plants & soil to destroy seeds
- Plant thick to fill quick



Step 1: Initial control of stiltgrass
with 30% Horticultural Vinegar



Step 2: Burn vegetation
and soil



“Scorched Earth”, Or It Will Fail



2 Blanket Sprays, 2 Spot Sprays, 3 Burns – 1 Year

TESTING FOR WEED SEED GERMINATION



Watered & Sealed in Greenhouse for Two Weeks

Cover crop of annual flowers & ryegrass



September, 2018

Seeding Day – June 19, 2019



JAPANESE STILTGRASS TO MEADOW TIMELINE

- Blanket vinegar application #1 – May 2018
- Blanket vinegar application #2 – June 2018
- Spot spray vinegar application #1 – July 2018
- Propane burn #1 – August 2018
- Annual seeding – August 2018
- Propane burn #2 – May 2019
- Spot spray vinegar application #3 – June 2019
- Propane burn #3 – June 2019
- Permanent seeding – June 19th, 2019
- 2 manual weedings (< 20 min) Summer/Fall 2019 – NO STILTGRASS

Whether we control them or live with them
or something in between ...

*...it is imperative to think for yourself
and not succumb to reductionist quick-fix thinking*

*... that synthetic chemicals are
“the only answer”*



THANK
YOU!