

NYBG/125

INVASIVE SPECIES SUMMIT:
CHALLENGES, STRATEGIES,
AND PERSPECTIVES

FRI, NOV 6, 2015

Co-presented with Lower Hudson
Partnership for Regional Invasive
Species Management



NEW YORK BOTANICAL GARDEN



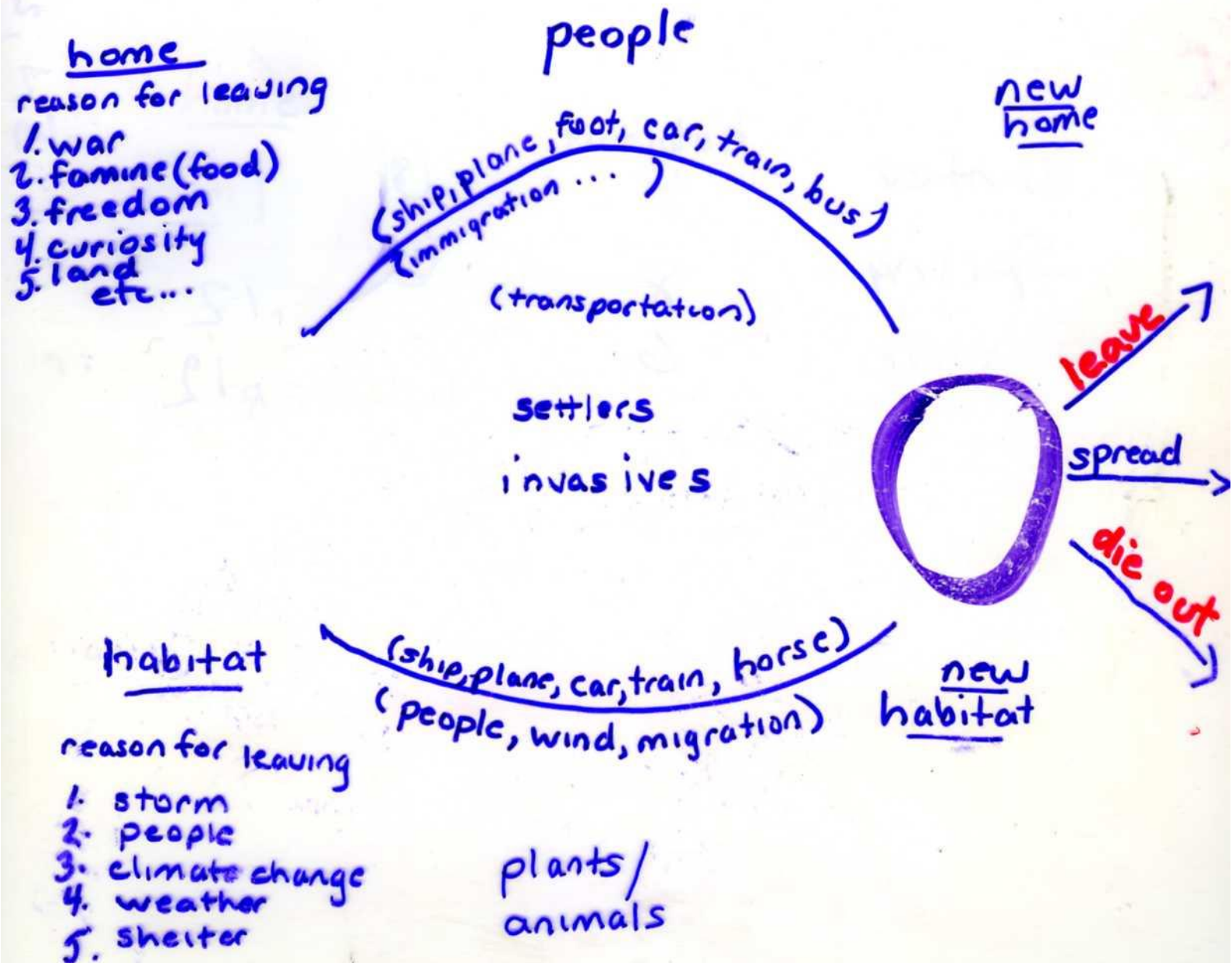
The Invaders

Board game and materials to answer
the questions,

What is an invasive?

How does it affect us?

Graphic Organizer Movement of People, Plants, and Animals



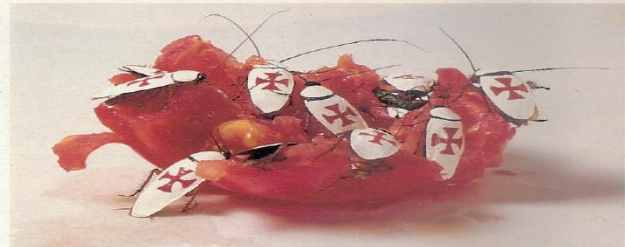
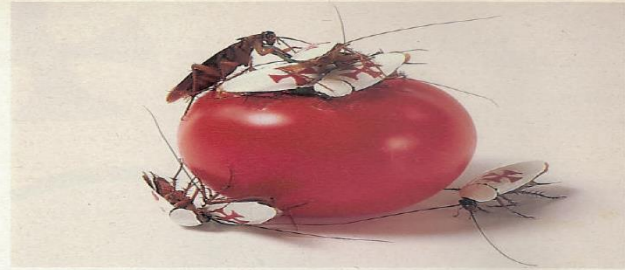
People have been moving stuff around the world for thousands of years. The Native Americans did it. The European explorers did it. The ancient Egyptians, Chinese and Polynesians did it. Every year more and more stuff moves around the world.

CATHERINE CHALMERS

HELLO, COLUMBUS

His arrival ended centuries of isolation — and sparked a monumental exchange between continents.

When Christopher Columbus made landfall in the Bahamas on Oct. 12, 1492, he set in motion a vast ecological transformation. The ride that conveyed Europeans to the New World also brought their cattle, horses, cats and pigs; their wheat, oats, grasses and nettles; their rats, insects and bacilli. Because the Americas had stood in splendid isolation for millenniums, the continent's diverse life forms were no match for the invasion-hardened genes of the Old World. While Europeans lacked the knowledge to carry out biological warfare intentionally, Cortés's conquest of Mexico and Pizarro's conquest of the Inca empire were made easier by smallpox, which preceded their armies and decimated the native populations. Meanwhile clover and thistles, peach trees and dandelions, opportunistic species all, conquered the fields and forests of the untrammelled continent. Christianity, firearms, the Roman alphabet, European styles of clothing, housing and protocol were imposed with minimal difficulty on the dazed and weakened natives. And what did the Old World receive in return? As punishment, only syphilis; very few American weeds were sufficiently aggressive to win retribution on foreign soil. The rewards that traveled east, however, were great: vanilla, maize, tobacco, potatoes, sunflowers, peanuts, tomatoes, indigo, chocolate. European diet and life style were altered profoundly; what started out as novelty quickly became immemorial tradition. These works by Catherine Chalmers depict one of the shock troops of the European invasion, the cockroach, fastening upon the bounty of the New World, represented by the tomato. The insect shown in these photographs, painted with an image that festooned Columbus's sails, did so well in its new home that it is now called the American cockroach. ■



Other Materials

New York Times Op-Ed ,

The First Thanksgiving

Charles C. Mann, *Unnatural Abundance*,
November 24, 2004)



IN THE FUTURE:

Foundation and Empire, Isaac Asimov
Landing at the planet Sayshell, Chapter 11:

“First, though, there’s a little matter of the ecological balance. Every planet has its own and they don’t want it upset. So they make a natural point of checking the ship for undesirable organisms, or infections. It’s a reasonable precaution.

We don’t have such things, it seems to me. (The ‘Foundation Planet’ is technically highly advanced)

No we don’t and they’ll find that out. Remember too, that Sayshell is not a member of the Foundation Federation, so there’s certain to be some leaning over backward to demonstrate their independence.” (define and explain trade issues, nationalism, protectionism)

NOW

Out There

Alien Protection Plan

It's natural to worry about contamination from aliens, but who worries about sheltering them from us? BY SHANNON PALUS



→ When Catharine Conley started her job at NASA, her predecessor gave her a pair of dark Ray Ban sunglasses. It's only fitting — Conley is a real-life version of the famously shaded title characters in the 1997 movie *Men in Black*. Part of her job as planetary protection officer is to keep Earth safe from alien life. But, as far as we know, Earthlings are the ones regularly hopping around the solar system, so most of her job is to protect aliens from the human race.

When humans — or our robotic stand-ins — travel to new places, we take more than we think with us. It's nothing new: biological stowaways have been hitching rides on terrestrial voyages for centuries. Christopher Columbus' trip to North America brought deadly diseases that wrought havoc on the Native Americans. In the 1800s, British rabbits were released into the wild in Australia, and they've been a multimillion-dollar nuisance to farmers ever since. And the winding, climbing kudzu plant, native

Catharine Conley

Before its 2011 launch, the Curiosity Mars rover (top) underwent \$10 million worth of sterilization efforts to prevent biological stowaways from "infecting" the Red Planet.

56 DISCOVERMAGAZINE.COM

Star Trek



Segment from Star Trek Episode:
3:03:36

**"THE TROUBLE
WITH TRIBBLES"**



TrekMovie.com



CATS



Pitcairn Island

- **AN INVASIVE STORY**
- There once was an island
- to which people accidentally brought rats.
- With so many rats,
- the people decided to bring some cats.
- But the cats ate too many birds.
- So the people poisoned the rats
- and removed the cats.
- But the rats returned,
- and now the people applaud
- the return of the cats.

The purpose of the game and lesson

The lesson and game teaches students that plants and animals, like **many things we buy, move around the world. This movement influences our daily lives and the environment we live in.**

Students will begin to understand why today there are customs and APHIS inspections designed to stop plants and animals from entering the country at airports, border crossings and ports. **The importance of monitoring and controlling imports and exports** to protect the world's crops and natural environments. Why is it important not to move animals, plants and pets long distances without giving it some thought.

From here, students can be challenged to connect what they have learned to the earth's future and space travel. What might happen as people spread to other planets?

Connections:



The best tie-in for this topic is some invasive or introduced species or a related issue (pets, prices, food...trade affecting your community (Collect 'made in'/'product of' labels from food and clothing in a **Where's that From Activity**). Otherwise, in the 4th grade and later social studies curriculums, students can make connections between the early explorers (who we could call the first "non-native visitors") and the changes for Native Americans and nature that followed.

Definitions

- **Trade:** A swap between two people, groups or countries. A trade can be for money or things. Someone takes something new home.
-
- **Invasive :** A plant or animal that comes from somewhere else and is a pest.
-
- **Non-native:** An animal or plant that comes from somewhere else. I wouldn't live in its new home unless it was brought there. Synonym: alien, exotic: A plant or animal not naturally found in a place. May or may not become a pest.
-
- **Pest** – An animal or plant that causes problems. A nuisance.
-
- **Trade + non-natives = invasives.** Sometimes a product or person from another country or place comes with an unexpected visitor. Like when you go outside and accidentally bring a tick or seed into your home with you.
-
- **Import:** To bring something into a country
- **Export:** To send something out of a country.
-
- **Travel** – to go from place to place. To move from place to place. To go on a trip.
-
- **Ballast** – Any heavy material used to make a ship more stable or balanced, especially when empty. Can be stone, water, dirt, wood or garbage. Ballast is often thrown away at some point. Invasives have often come in on ballast.
-
- **Established** - To get successfully started and settle in permanently.
-
- How can we stop invasives?
-
- **Prevent:** Make sure they don't get a start and spread. (stop before they start)
- **Contain:** Hold in one place. Keep from spreading.
- **Eradicate:** To do away with. Get rid of. Stop. Eliminate.
-
- **Biocontrol:** biological control: The control of destructive organisms by the use of other organisms, such as the natural predators of the pests.

Instructions for “The Invaders” Game

- 1. Download game board, cut out Spread, Cause and Prevent cards, or add your own. You will need some dice and player pieces (anything available will do)
- 2. Roll the dice (1 or 2 dice can be used, depending on the time available). If you land on S(Spread card), C (Cause card), P (Prevent card) read the cards and follow the instructions.
- 3. If you land on Q (Quarantine), skip a turn.
- 4. The game mirrors real life situations. The game is filled with successes and setbacks, just like real-life. First person to the end wins the game.
- 5. Some enrichment materials are attached.

Cause, Spread, Prevent Cards and Quarantine

CAUSE

It's not a one way street.
Invasives travel from the United States to other countries too!

**GO 4 SPACES IN A DIRECTION AWAY
FROM THE UNITED STATES.**

CAUSE

Does the planet Mars have life or did we accidentally bring it there? Was the equipment cleaned well enough before it left the earth?

SKIP A TURN

SPREAD

Your pet cat loves (to eat) birds.
Pets often become invasive.
Be careful.

MOVE BACK 3 SPACES

SPREAD

The French may be great cooks, but American plants changed the way Europe eats (vanilla, Corn, pumpkins, tobacco, potatoes, chocolate....)

MOVE FORWARD 4 SPACES

PREVENT

New law: register all pets.
Pet owners are angry.
Will the law pass?

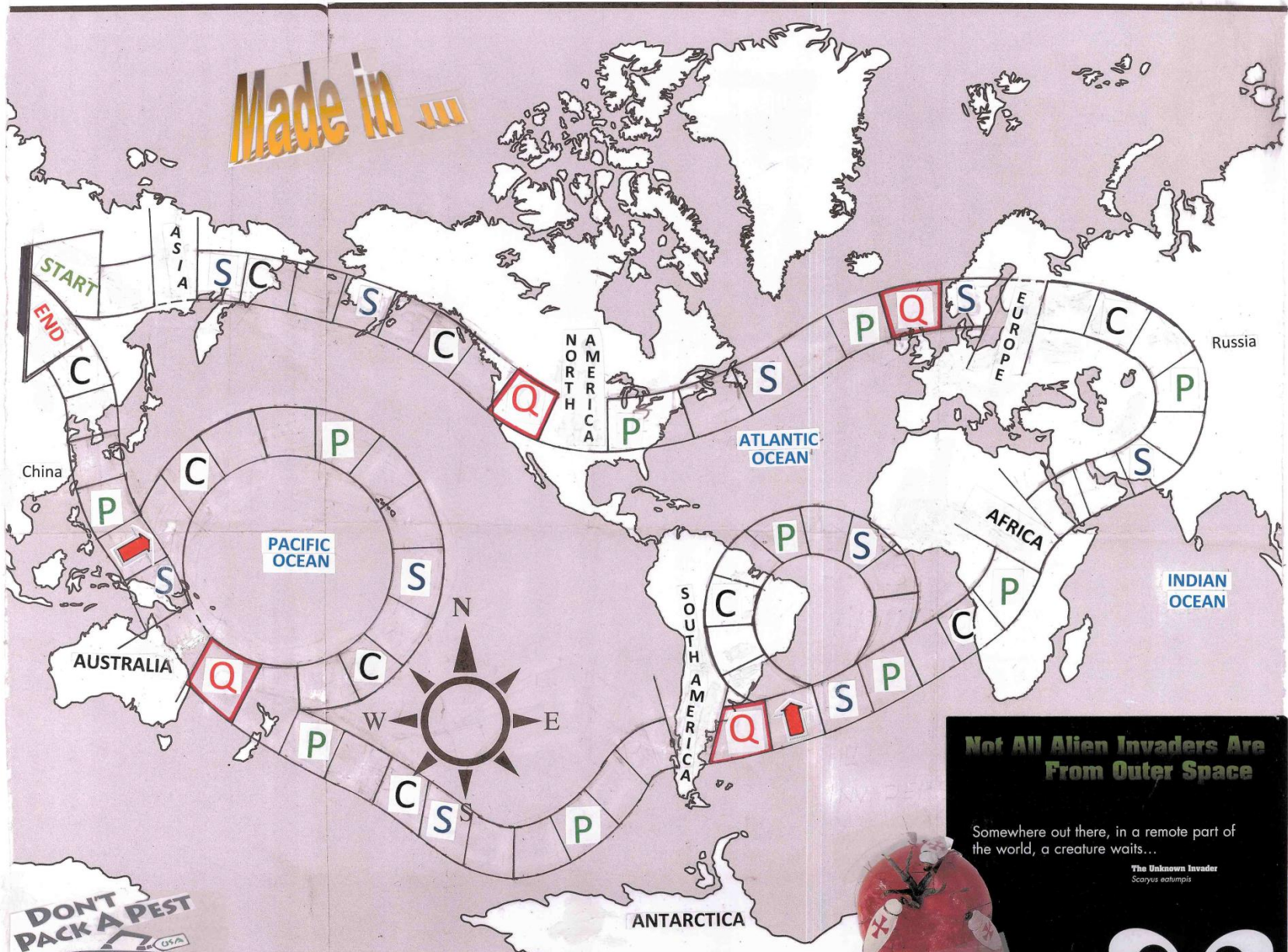
**ROLL DICE, EVEN # SKIP A TURN,
ODD #, GO FORWARD THAT #**

PREVENT

The government passes a law requiring monitoring and treatment of all imports.
Stops trouble before it begins.
You celebrate!

GO FORWARD 6 SPACES

Made in 



Not All Alien Invaders Are From Outer Space

Somewhere out there, in a remote part of the world, a creature waits...

The Unknown Invader
Scaryus eatumpis



The Invaders

Un-wanted: Invasives, What are They?

Brochure: Page 1 of 4

For more information on invasives,
go to:

www.ipcnys.org
www.invasivespecies.gov.htm
www.esa.sdsc.edu/invas3.htm
www.sgnis.org
www.nas.er.usgs.gov

key terms: non-native, invasive species,
introduced species, exotics, foreign,
spread, predators, trade, exotics, Hudson
Valley.

For more information, contact:

- US Forest Service
- County Cooperative Extension Office
- NY State Dept. of Environmental Conservation
- APHIS (U.S. Animal and Plant Health Inspection Service)



Container ships

George Profous, 2010

Un-Wanted Invasives: What are They ?



Top to bottom: Asian long-horned beetle (Inset: Emerald ash borer), garlic mustard, Asian carp (inset: Chinese snake fish) and nutria.

What is an invasive ?

An invasive is a plant, animals, or insect (or even a fungi or virus, like West Nile Virus) which is not naturally found in an area, and which spreads and harms human health and native plants and animals. It also goes by names like exotic, alien, non-native or introduced species. However, even native plants, like poison ivy, can be called invasive if they invade disturbed areas or new places if climate changes.

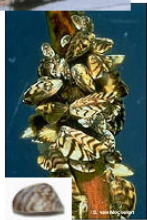
By some estimates, 5,000 alien-invasive plants and 2,300 exotic animals spreading through the United States. Fortunately, most of these do not cause noticeable harm. Some non-native species cause trouble because they do not find natural predators in their new home, so they spread easily and quickly. Of every 100 foreign plants and animals brought to the United States;

- * about 10 will start to spread through the United States.
- * 5 will move into nature (our native forests, fields and wetlands), and
- * 2-3 will become pests, causing problems and costing a lot of money to slow down or stop.

Invasives have made some native species rare and can homogenize our landscape by reducing our rich mix of native plants.



Zebra mussels began to spread in through our rivers and lakes around 1985. By 2003 the cost of controlling the mussels was over **\$5 billion dollars**.



The nationwide cost to taxpayers for controlling introduced plants, animals and insects is now over 137 billion dollars a year.

Invasive Species in New York State

Because of New York State's unique location, many invasive species start here and spread. New plants and animals have been coming here since the first explorers came ashore in the 15th century. Today, one of three plants in New York has come from elsewhere. Many have been around so long we take them for granted. Today, our airports and harbors, linked to travel corridors in the Hudson and Mohawk River valleys, still spread invasive species.

Q: How do they come ?
A: Transportation

Whenever we move people, products, animals and plants, either accidentally or On purpose. In trade, recreation or travel.



Where do they hide ?

On airplanes, automobiles, trucks, boats, cargo ships, trains, or even on your shoes.

Why do they come ?
Species from abroad have come here by accident and on purpose.

In the past, people immigrating or traveling often brought plants and animals they liked with them for food, medicine, for their beauty, or simply to help them feel more at home in a new land. Today, invasives usually get started by accident, and as a result of world trade.

Zebra mussels came over in ship ballast from northeastern Europe.

Some Invasives in New York and Where They Come from: (Some have been around a long time. All are now spreading. Have you seen any of these?)

Gypsy moth was introduced to America in 1869 from Europe by a scientist who wanted to introduce silk-producing worms to America.



Barberry bushes were brought over as a good natural fence and medicinal herb from Europe and Japan 300 years ago (see next page).



Norway maple, from Russia, was brought over as a nice tree which grows well in cities.

Halloween ladybug was introduced from Japan in 1979 to control crop pests in Louisiana.



Chinese water chestnuts were brought from Asia to beautify ponds.



Starlings were brought from England by a fan of Shakespeare plays because they looked good on the stage.



European Starling (winter plumage) by Lerry McQueen

Hemlock wooly adelgid came on plants from Japan and spread before anyone noticed.



Garden City lizards arrived in Kennedy Airport from Italy.



Asian long-horned beetles came on wood packaging from China to New York City (see cover).

Cats were brought over as pets from Europe but originally came from North Africa and Asia.

Snake Fish and Carp were brought from China as food and part of a holiday tradition (see cover).

Mile-A-Minute Weed is just moving into New York State and could soon cover thousands of acres. It can grow 6 inches a day.



Worms found in northern forests are all European Earthworms. Glaciers eliminated earthworms in the northern part of the United States. Earthworms from the southern US normally would take 14,000 years to travel 40 miles. Earthworms are changing our forests.



For more information on the top 20 invasives in New York State, go to the NY Invasive Plants Council at:

www.ipcnys.org.

Are exotic introductions still occurring ?

Yes, and more and more often because of increasing world trade, especially with places where climates are similar to our own. Look in stores, you'll find labels from all over the world, including places like China, India, Hong Kong, Japan, El Salvador, Mexico, Eastern Europe and South America.



Look at the clothes, toys, foods, furniture, lumber, live fish and animals, landscape plants in stores, and the tourists around you ? Have you ever traveled ?

Each time anything is sent or anyone travels, there is a small chance an unwanted hitchhiker has come along. Can you think of other ways invasives are introduced ? Can some animals in pet stores become invasives ?

What can you do ?

Don't bring plants, flowers or foreign seeds with you from trips abroad or from far away, even within North America.



Don't move firewood out of state. Moving firewood, even out of your county, can spread an invasive.

Avoid buying and using plants that are known to invade New York's native forests and fields, such as barberry, purple loosestrife, autumn and Russian

Olives, non -native honeysuckles, Japanese knotweed, vinca and Norway Maples - to name just a few. On the internet, the DEC, US Forest Service and many other organizations provide information. Just type In "Invasive Species."

Wash your boat thoroughly when moving from one waterway to another.

Wash heavy equipment, especially tires If you are a builder or logger on lands known to have invasives.

Empty bait buckets and fish buckets before going to another waterway.

Support strong laws and customs inspections of travelers and imported/exported goods.

Insist that plans for introducing new species be carefully studied and documented - looking at what surprises might happen in a new land. Keep in mind that not all introductions are bad or harmful. Examples are city trees, food crops, medicinal plants and helpful insects.



Top: Multiflora Rose: Used in hybrid rose rootstocks, once used as a great hedge shrub especially on farms. Now its dense growth and thorns can turn a park into a nightmare.
Bottom: Japanese barberry from landscaping to a barberry invasion in nature.

Name _____ Date _____

Answer the following questions using the Non-native Species: Exotics, Invaders and Pests brochure.

Fill in the blanks:

- _____ out of every 3 plants in New York State are from another country.
- By the year 2003, controlling zebra mussels cost more than _____.
- List **6 ways** non-native (invader) plants and animals can hide and enter the United States. _____

_____.

Circle the most appropriate answer:

- Why have animals from other countries been brought (introduced) into the United States ?
 - food
 - medicine
 - landscaping
 - by accident
 - all of the above

(Please, turn over)

Brochure
questions
continued.

Fill in the blanks:

5. Barberry bushes came from _____.
The Halloween ladybug is from _____.
Starlings are from _____.
Cats came (originated) from _____.

Europe/Japan

Japan

England

North Africa

Answer either True (T) or False (F)

6. How can you stop invading plants and animals ?

_____ Plants and seeds from other countries make wonderful gifts for friends in New York.

_____ Don't plant invasive landscape plants like Barberry and Purple Loosestrife.

_____ Invading plants and animals usually have many predators.

ANYTHING MORE ?

IS 'BORING'

TAKES TOO MUCH TIME

**IS BEYOND THE TEACHERS EXPERTISE AND
COMFORT ZONE**

EVEN THIS MAY REQUIRE YOU TO MAKE A
SPECIAL CLASS/SCHOOL VISIT.

**PRESENTATION IS EVERYTHING.
WOULD YOU RATHER READ THIS:**

Title of Unit: Invasives Arrive (But What Are They? and Why Do They Come ?)

Name of Teacher: George Profous

Grade Level: 3-6

Unit Overview:

Everything in the world is connected (interrelated) to everything else - trade, food, weather, pollution, people and history. We are apart of the natural world (**biosphere**) and studying invasive species is a good way to illustrate how everything is connected by applying the principle geographic themes of **location, place, human environment** and **interaction**, and **movement**.

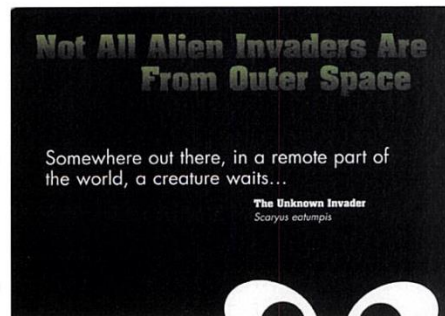
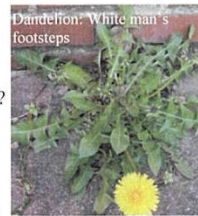
In the past, explorers and settlers brought with them plants and animals - either on purpose or accidentally-from other parts of the world. Some of these became *invasives*. Today, as travelers and consumers, we often unknowingly help move elements of the biosphere from one part of the world to another with often unforeseen results. Most of these species which came with the European settlement of the United States beginning about 400 years ago, have now been around so long we accept them as belonging here - earthworms, dandelions, rats, cockroaches, pigeons, starlings, house sparrows, brown trout, daylilies, Japanese beetles and chickenpox - to name only a few. Others have arrived lately and sometimes make headline news. The “**Un-wanted Invasives**” **brochure** which is part of this unit provides more samples.

What are non-native species, especially invasive plants and animals from other lands? Where are they from, how do they get here, and what can happen when they are not stopped? These are questions which will be answered by activities and students working in small groups to answer these questions.

This unit presupposes a prior knowledge of the following terms: continents, climate, country, travel, and species. Students should know the locations of the seven continents and some of the major countries and climates in different regions of the world. As an introduction, you might use the **Movement of People, Plants and Animals Graphic Organizer** to tie-in invasive species (Science) to the study of explorers and settlers (Social Studies). Or, you might ask students about where the things they buy come from, about their family travels, or even their family origins. **Where’s That From?** can be used as a take home exercise to begin making connections between trade, movement and invasives.

The Animal and Plant Health Inspection Service (APHIS) puts out an excellent poster and 15 invasive cards entitled “Not All Alien Invaders Are From Outer Space.”

The invasive species brochure, **Un-wanted Invasives - What are They?** and **Guide** (attached) can be used to involve students in getting answers to initial questions that might come up. There is no need for a teacher to know much about the topic. Students then research an invasive species of their choosing (**A list of suggestions is provided**) and share their findings by creating a poster or choosing another method of presentation. (You are welcome to use the **Invasive Species Research Project Sheet**).



Introduction. Can be followed by the “Invaders Game.”

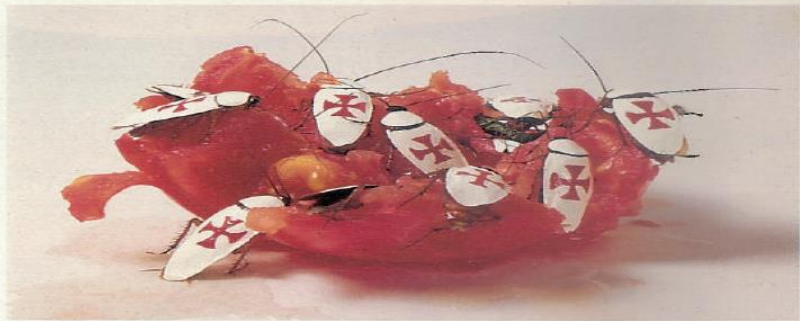
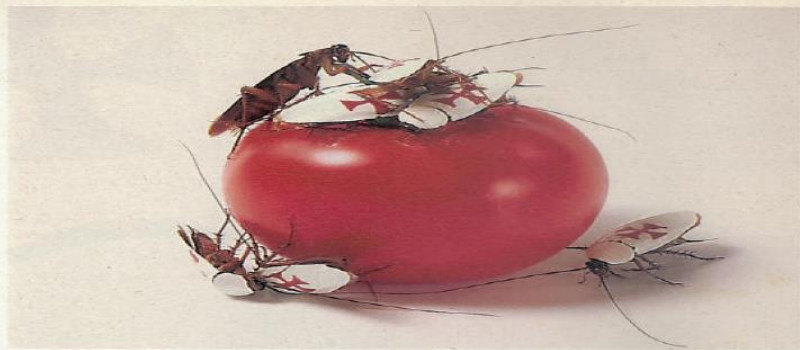
But the “Invaders Game” can also be done independently with the first 6 slides in this powerpoint .

OR

HELLO, COLUMBUS

His arrival ended centuries of isolation — and sparked a monumental exchange between continents.

When Christopher Columbus made landfall in the Bahamas on Oct. 12, 1492, he set in motion a vast ecological transformation. The tide that conveyed Europeans to the New World also brought their cattle, horses, cats and pigs; their wheat, oats, grasses and nettles; their rats, insects and bacilli. Because the Americas had stood in splendid isolation for millenniums, the continent's diverse life forms were no match for the invasion-hardened genes of the Old World. While Europeans lacked the knowledge to carry out biological warfare intentionally, Cortés's conquest of Mexico and Pizarro's conquest of the Inca empire were made easier by smallpox, which preceded their armies and decimated the native populations. Meanwhile clover and thistles, peach trees and dandelions, opportunistic species all, conquered the fields and forests of the untrammelled continent. Christianity, firearms, the Roman alphabet, European styles of clothing, housing and protocol were imposed with minimal difficulty on the dazed and weakened natives. And what did the Old World receive in return? As punishment, only syphilis; very few American weeds were sufficiently aggressive to win retribution on foreign soil. The rewards that traveled east, however, were great: vanilla, maize, tobacco, potatoes, sunflowers, peanuts, tomatoes, indigo, chocolate. European diet and life style were altered profoundly; what started out as novelty quickly became immemorial tradition. These works by Catherine Chalmers depict one of the shock troops of the European invasion, the cockroach, fastening upon the bounty of the New World, represented by the tomato. The insect shown in these photographs, painted with an image that festooned Columbus's sails, did so well in its new home that it is now called the American cockroach. ■



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NEW YORK BOTANICAL GARDEN





Guidelines for Urban Forest Restoration

Jennifer Greenfeld

Forestry, Horticulture & Natural Resources

NYC Parks & Recreation

Parks

GUIDELINES FOR URBAN FOREST RESTORATION



NYC Parks



NYC Parks

GUIDELINES FOR URBAN FOREST RESTORATION



NYC Parks

Katerli Bounds
Michael J. Feller
Jennifer Greenfeld
Minona Heaviland
Clara Pregitzer
Tim Wenskus

AECOM



NYC Parks

Why a New Reference Document?

- Existing References Limited
 - Element Stewardship Abstracts (The Nature Conservancy)
 - Management and Restoration Notes (SER)
 - *Once and Future Forest* (Leslie Sauer)
- Internal documents in boxes and basements
- Photos still on slides
- Staff Turnover: Oral History isn't always enough
- MillionTreesNYC forced NYC Parks to scale up quickly



PART ONE:

BACKGROUND AND CONTEXT

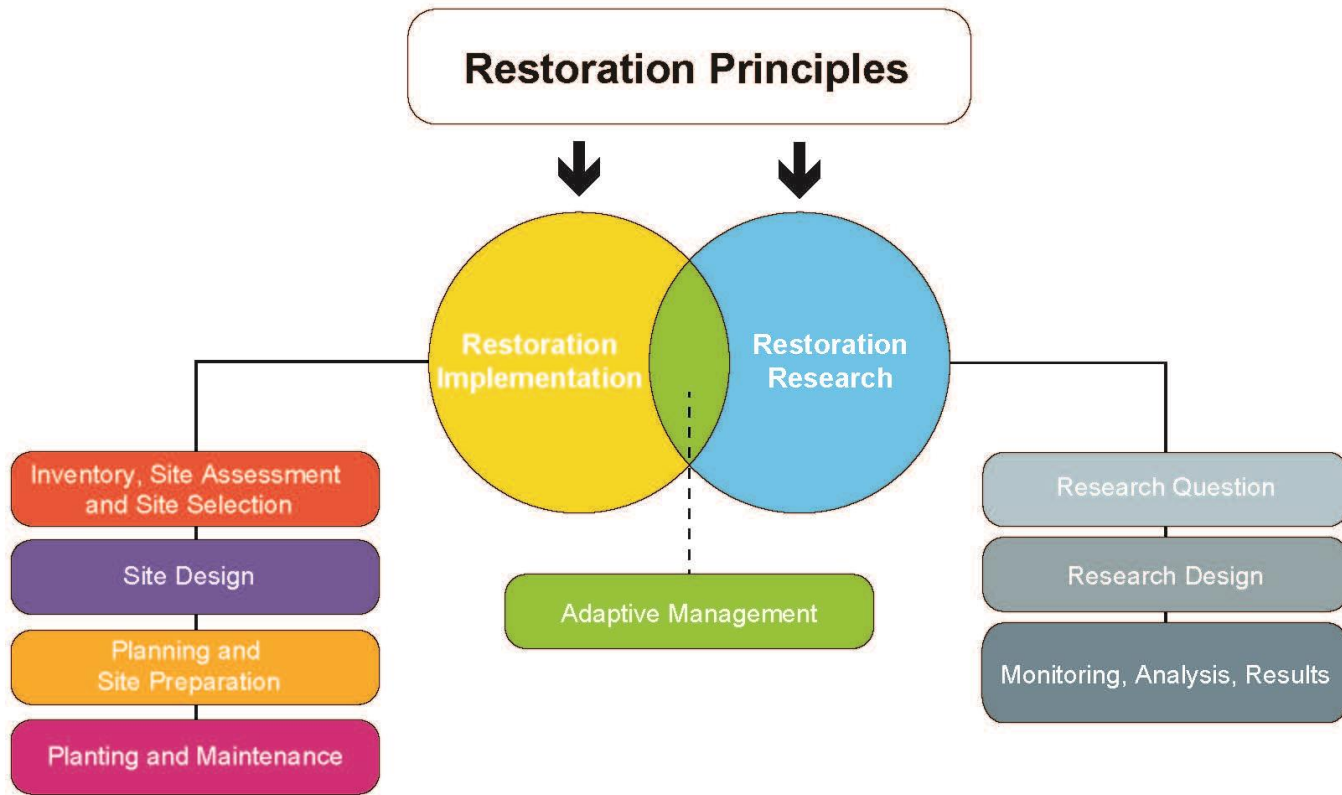
CHAPTER 1: Forest Restoration in New York City	8
CHAPTER 2: The Urban Forest: Restoring Structure and Ecosystem Function to Natural Areas	22



Forest Restoration Over 30 Years

- Inventoried 7,000 acres of natural areas
- Developed 9 Park Management Plans
- Spent money: \$70M
- Planted nearly one million native plants
- Managed 600 acres (invasive removal, removed cars)
- Protected 4,000 acres with 5 miles of guardrail
- Managing 460 acres of establishing native species plantings
- Restored Prospect Park Ravine: 250,000 native plants, 26 acres
- Partnered with or initiated over 1,800 long term research plots, established by five different groups
- Worked with over 15,000 volunteers





Urban Forests are Filled with Challenges



Invasive Species



Urban Forests are Filled with Challenges



Dumping

Urban Forests are Filled with Challenges



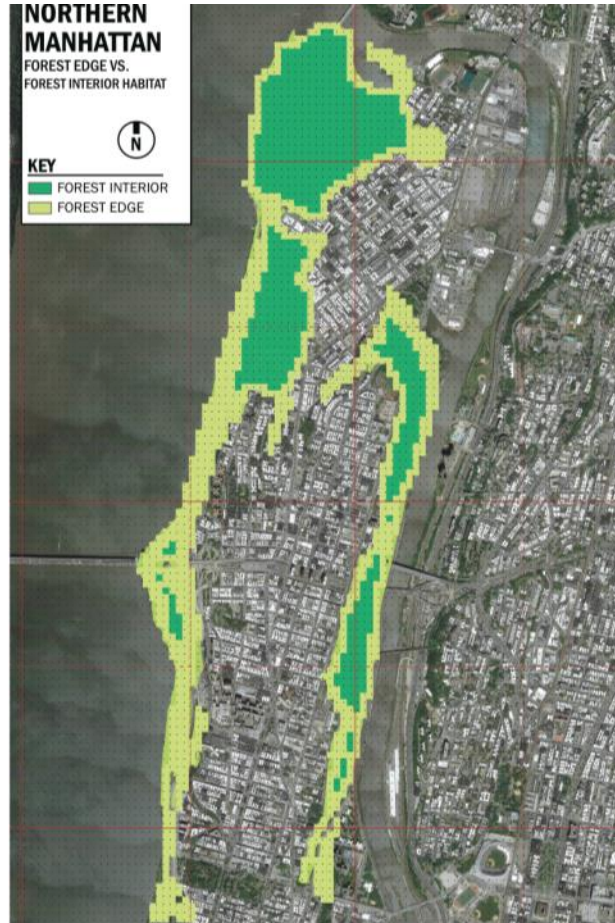
Arson

Urban Forests are Filled with Challenges



Anthropogenic Soils

Urban Forests are Filled with Challenges



Fragmentation

Urban Forests are a Legacy of...



Alley Pond Park, Queens early 1900's

Abandoned Agriculture



Urban Forests are a Legacy of....



Landfills



Urban Forests are a Legacy of....



Hunter Island, Bronx

Abandoned Estates



Urban Forests are a Legacy of....



Urbanization



Restoration Goals: Structure



Restoration Goals: Function



PART TWO: PLANNING THE WORK

CHAPTER 3: Site Inventory, Assessment, and Selection 42
CHAPTER 4: Site Planning and Design 62

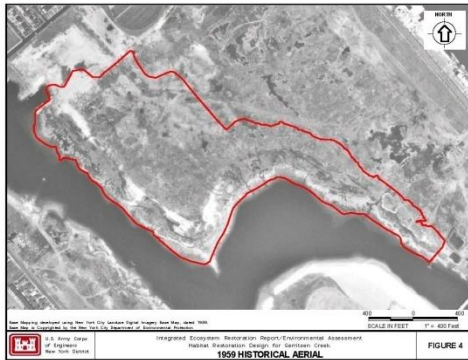


As in any restoration project, there are always opportunities and constraints.

Criteria									
Space	Private Owned						Federal Owned	State Owned	City Owned
Shape	Linear								Round
Size	Small < 10 acres								Large > 10 Acres
Soil	Absent (paved)	Anthropogenic Soil Hazardous Fill	Anthropogenic Soil Clean C&D Fill	Anthropogenic Soil Clean Sanitation Fill	Anthropogenic Soil Ocean Dredge	Cultural Soil (Horticultural or agricultural)	Natural Soil Disturbed	Natural Soil Undisturbed	Present Green Space
Existing Habitat	Federally Endangered flora/fauna	State rare flora/fauna	Locally Rare flora/fauna	Native Plant Communities			Invasive plant Dominated	Lawn	Canopy Gap
Park Use	Programmed	Active		Passive					Unprogrammed
Access	Difficult								Easy
Ecological Context	Surrounded by Invasives	Adjacent to Invasives	Near Invasives	Near Native Plants	Adjacent to Other Native Plants	Adjacent to Native Forest	Surrounded by other Native Plants	Natural Soil Undisturbed	Surrounded by Native Forests
Conservation Policy	No Policy				Tree/Forest Protection Policy				Funded Initiative
Regulatory	Regulated Wetland	Mapped DEC Freshwater Wetland	Mapped DEC Freshwater Adjacent Area	Mapped DEC Tidal Wetland	Mapped DEC Tidal Wetland Adjacent Area				Unregulated
Historic/Cultural	Significant	Designated Landmark	Archeological sensitivity	Notable Designer	Anthropogenic Soil Ocean Dredge				No Significance



Marine Park, Brooklyn



Opportunity

Multi-ecotype restoration to restore a contiguous landscape.



Constraint

Multiple stakeholders with various timelines and requirements.



Outcome

Restoration of 20 acres of salt marsh, 6 acres of forest through patience and persistence.

Conference House Park



Opportunity

Restoration of rare coastal habitat



Constraint

Potential Native American artifacts



Outcome

Planted seedlings and live stakes instead of 1gal containers.

Graniteville Swamp Park, Staten Island



Opportunity

Restore a degraded edge of underutilized park



Constraint

Shallow soil

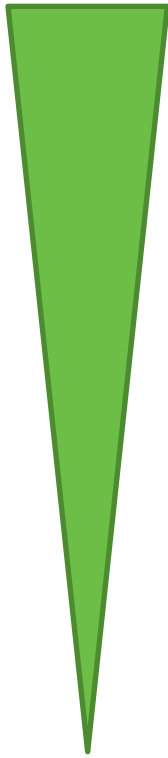


Outcome

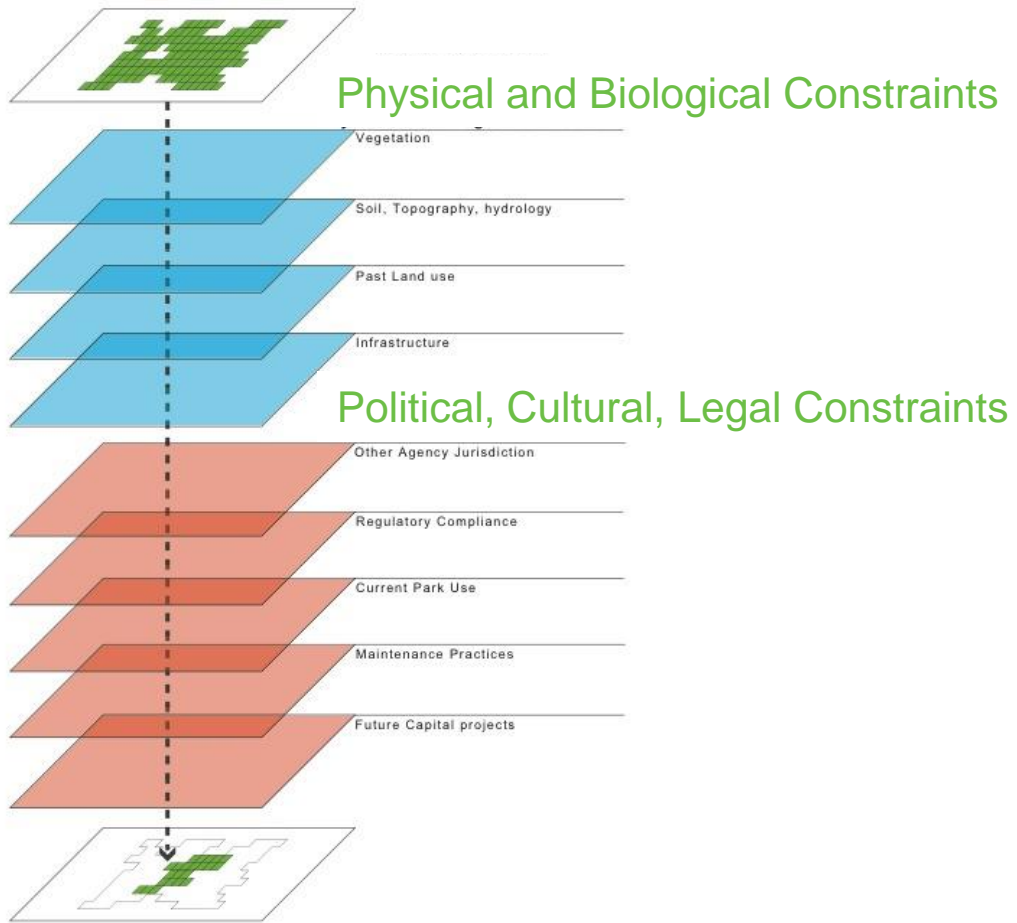
Abandoned project

Allow for Site Constraints

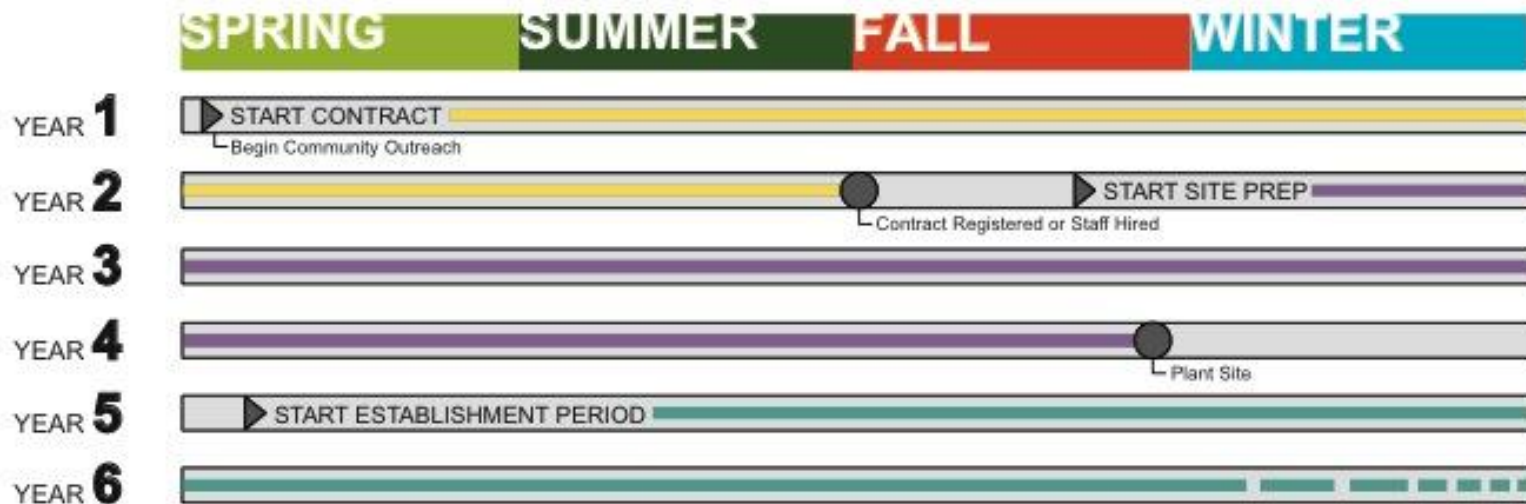
Proposed Restoration Area



Final Restoration Area



Give Yourself Plenty of Time



Select appropriate species with local provenance and genetic diversity



PART THREE:

BUILDING THE FOREST

CHAPTER 5: Site Preparation 82

CHAPTER 6: Planting, Establishment, and Adaptive Management 106

Adapt Best Practices

Foliar Spray Method



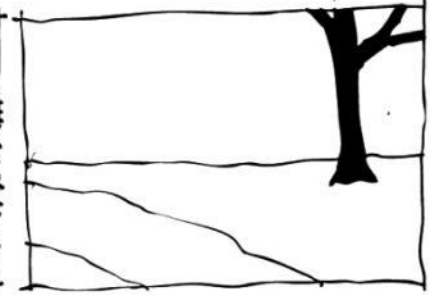
1. Existing Conditions.



2. Spray all foliage with herbicide.



3. Cut dead vegetation no less than 30 days after herbicide application.

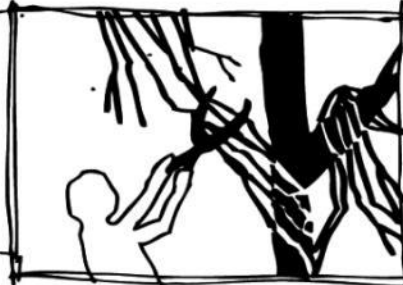


4. Site is cleared of existing invasive vines. Clear all dead vegetation from site.

Basal Bark Method



1. Existing Conditions.



2. Cut vines out of any vertical structures, cutting as high as can be reached.



3. Spray all visible bark of vines.



4. Vines can be cut and disposed of no less than 60 days after herbicide application.

Cut Stump Method



1. Existing Conditions.



2. Cut vines out of any vertical structures, cutting as high as can be reached.



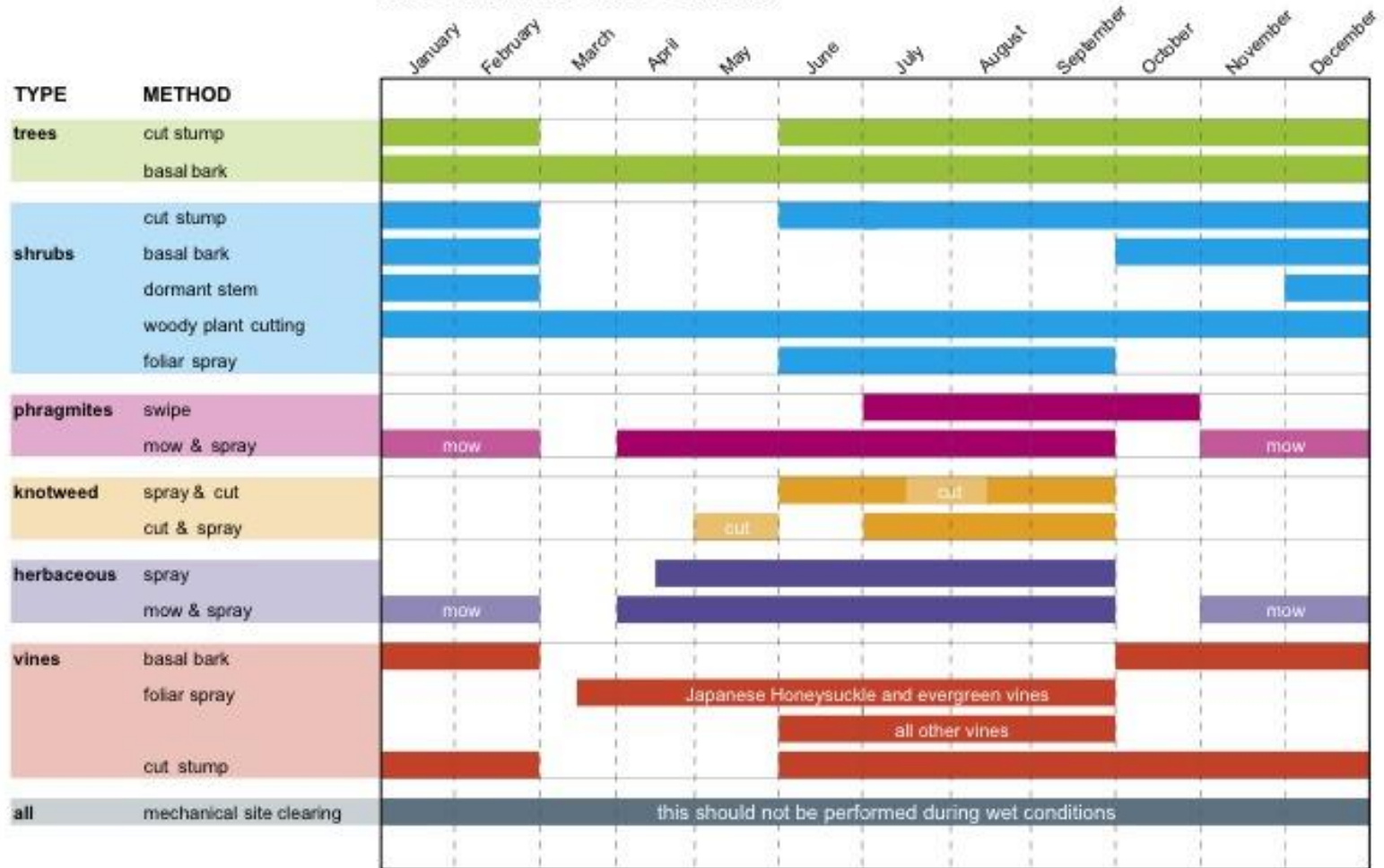
3. Source of vines must be found in order to cut the vines as close to the ground as possible.



4. Spray stumps of vines immediately after cutting

Adapt Best Practices

NRG TREATMENT CHART



Engage Communities



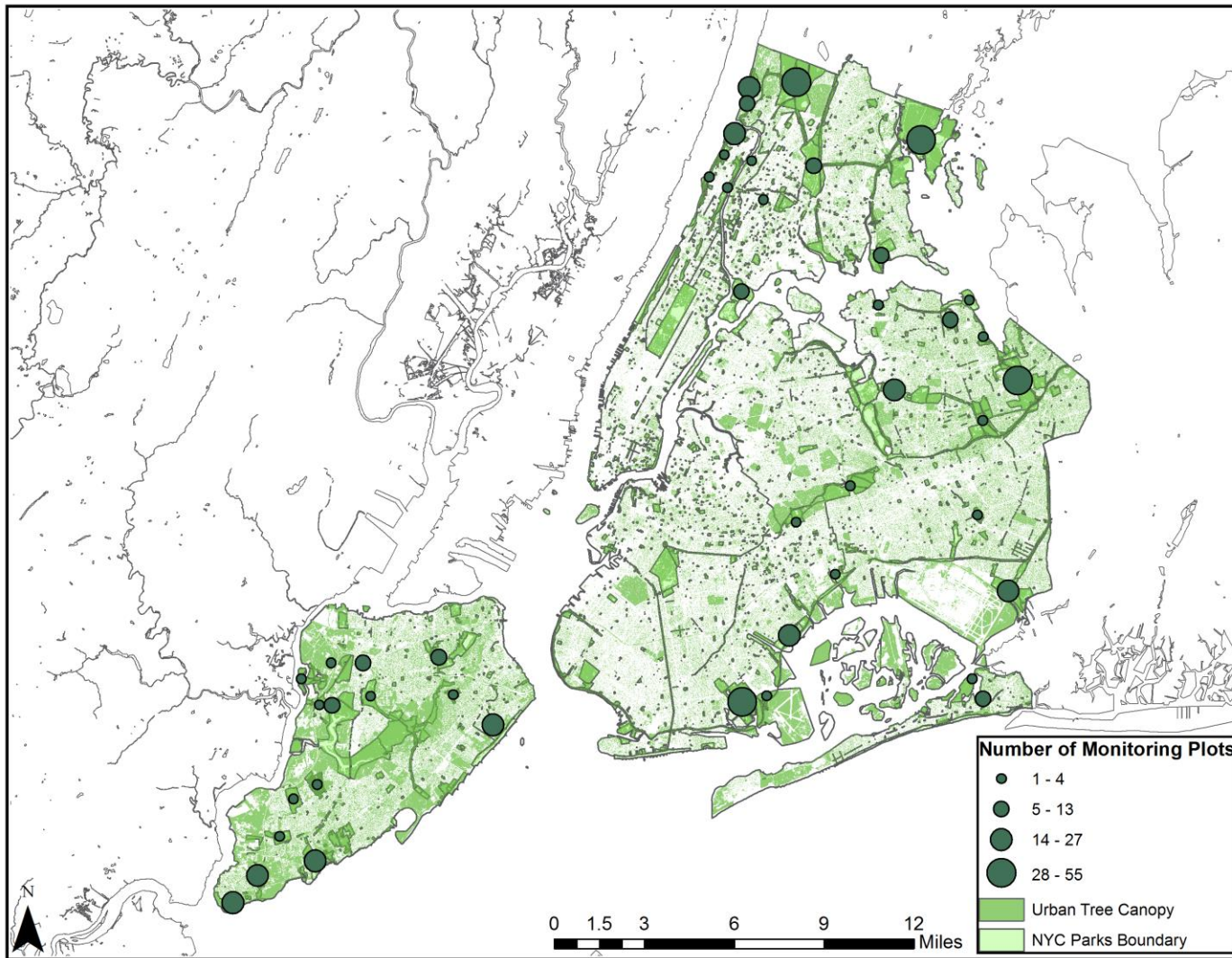
PART 3: BUILDING THE FOREST CHAPTER 6: PLANTING, ESTABLISHMENT, AND ADAPTIVE MANAGEMENT

Manage After Planting

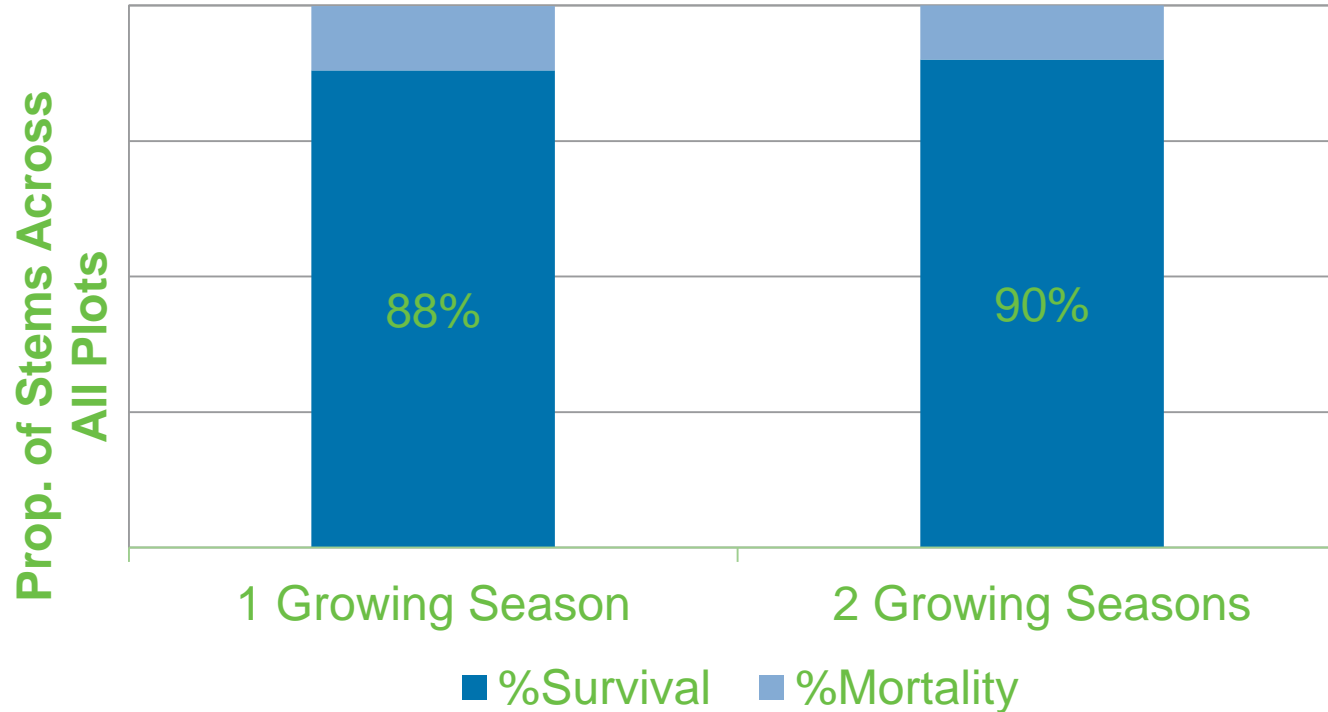


PART 3: BUILDING THE FOREST CHAPTER 6: PLANTING, ESTABLISHMENT, AND ADAPTIVE MANAGEMENT

MillionTreesNYC Survival Study



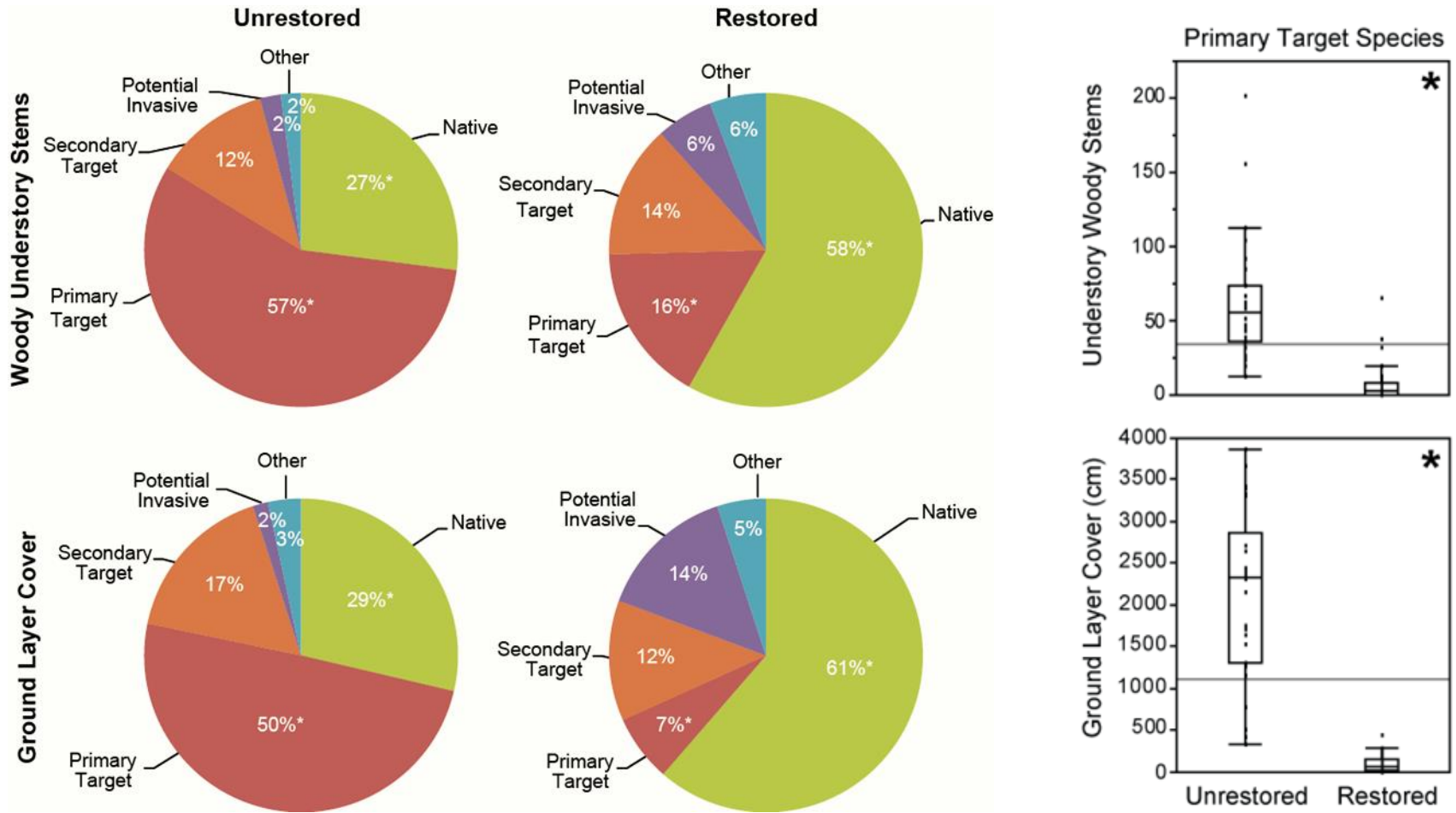
MillionTreesNYC Survival Study



Simmons, B. (n.d.). *MillionTreesNYC: Reforestation Survival Study*. Unpublished raw data, NYC Urban Field Station, New York, NY.



Early Restoration Success



Johnson, Lea R. and S.N. Handel. In revision for *Ecological Applications* (2015). Restoration treatments in urban park forests drive long-term changes in vegetation trajectories.

PART 3: BUILDING THE FOREST CHAPTER 6: PLANTING, ESTABLISHMENT, AND ADAPTIVE MANAGEMENT

Forest Restoration Over 30 Years

- Identify a Goal
- Secure the Borders
- Strengthen the core
- Really really remove invasive plants
- Close canopies
- Develop structure (will this lead to restored function?)
- Carefully select plant material
- Revisit, study, and care for sites
- Involve Communities





Guidelines for Urban Forest Restoration

[nycgovparks.org/
greening/
natural-resources-group/
publication](https://nycgovparks.org/greening/natural-resources-group/publication)

Parks

NYBG/125

INVASIVE SPECIES SUMMIT:
CHALLENGES, STRATEGIES,
AND PERSPECTIVES

FRI, NOV 6, 2015

Co-presented with Lower Hudson
Partnership for Regional Invasive
Species Management



NEW YORK BOTANICAL GARDEN



WHAT IF WE START A MOVEMENT?

EDUCATION AND OUTREACH



Pound Ridge, NY

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Scotfield Rd















Japanese Knotweed



Garlic Mustard



Mugwort



Oriental Bittersweet



Porcelain Berry

Invaders - Are they in your garden?

How do we stop them?





THE RECORD-REVIEW

Conservation board eyes invasive species

By DON HEPNER

A public/private initiative between the Henry Morgenthau Preserve committee and the Pound Ridge Conservation Board could be the beginning of the end for invasive plants in town.

"By definition, invasive species cause harm to human health, the environment or economics," said Carolyn Sears, a member of the Pound Ridge Conservation Board and of the Morgenthau committee.

The Invasives Project Pound Ridge, known as "TIP-PR," was unanimously endorsed by the conservation board during its December meeting. "The committee of the Morgenthau Preserve of the Audubon Society also enthusiastically endorsed TIP-PR at their December meeting," said Ms. Sears

...en, chairwoman of the ... committee Marilyn ... Ms. Sears have been ... ple at the Mianus River ... Ridge Land Conser- ... stchester Land Trust ... ts to eliminate inva- ... the area's flora. ... Ms. Sears sought ... local knowledge ... eir January and ... will be held at ... ry and will be

... edule work ... Bert...



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**THE
INVASIVES
PROJECT**

Pound Ridge

Initiative of

The Henry Morgenthau Preserve,
Bedford Audubon Society,
Pound Ridge Conservation Board

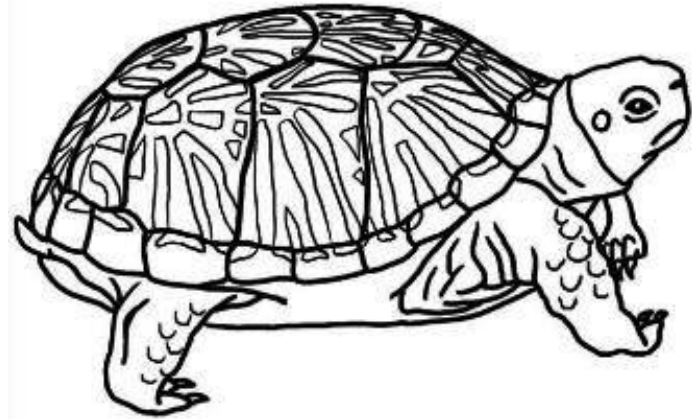
SET BOUNDARIES:

TIME

SCOPE OF PROJECT

TARGET SPECIES

GEOGRAPHIC



KNOW WHY THE ISSUE IS IMPORTANT TO YOU.

The problems with invasive plants:

- quick to establish, aggressive growth and reproduction
- destructive of native habitat for insects and birds
- relentless spread to new areas
- lack of natural controls on growth and reproduction that would be found where invader is native

Learn what invasive plants grow in your backyard and what you can do to stop their spread:

www.cipwg.uconn.edu

www.eddmaps.org/ipane/

Invasive plants are abundant in our local parks, including Greenwich Point.

To find out how you can help visit:

www.FriendsofGreenwichPoint.org



KNOW

AN ACCEPTED DEFINITION

RECOGNIZED LIST OF INVASIVE SPECIES

WHAT THE CRITICS SAY.



IDENTIFY YOUR AUDIENCE.



WRITE A MISSION STATEMENT.




CHOOSE YOUR WORDS WISELY.

**IMPROVED VIEW; HEALTH & SAFETY;
TREES SAVED;
PROTECTING PROPERTY VALUES;
SUPPORTING WILDLIFE;
BRINGING BACK WILDFLOWERS**

WE CAN MAKE A DIFFERENCE.

*OUR MISSION IS TO
PROTECT THE NATURAL BEAUTY
OF POUND RIDGE,
PRESERVE WILDLIFE HABITAT,
ENCOURAGE THE USE OF NATIVE PLANTS,
AND LIMIT THE SPREAD OF INVASIVE
SPECIES.*



CREATE AN IDENTITY.





Vine Cutter

Invasive Strike Force

Early Detector/Rapid Responder

Roadside Warrior

TIP

PUT THE

ORGANIZATION'S NAME,
CONTACT INFORMATION,
AND DATE

ON EVERYTHING.

The bottom of the slide features a decorative graphic consisting of several overlapping geometric shapes. On the left, there is a green triangle pointing towards the center. To its right is a larger, light blue triangle pointing towards the right. The rest of the bottom section is filled with a solid light blue color.

FORM PARTNERSHIPS.



**WHAT
CAN YOU DO
FOR
NOTHING?**



EVENTS

GET THEM IN THE DOOR

ASK FOR SOMETHING IN RETURN:

GIVE ME AN HOUR OF YOUR TIME...

POOL OWNERS SOUGHT TO MONITOR FOR ALB



Recruit Birders



JAPANESE STILTGRASS IN EAST WOODS



HIGH RIDGE ROAD

**JAPANESE
KNOT WEED**

PROJECT







OUTDOOR ACTIVITIES:



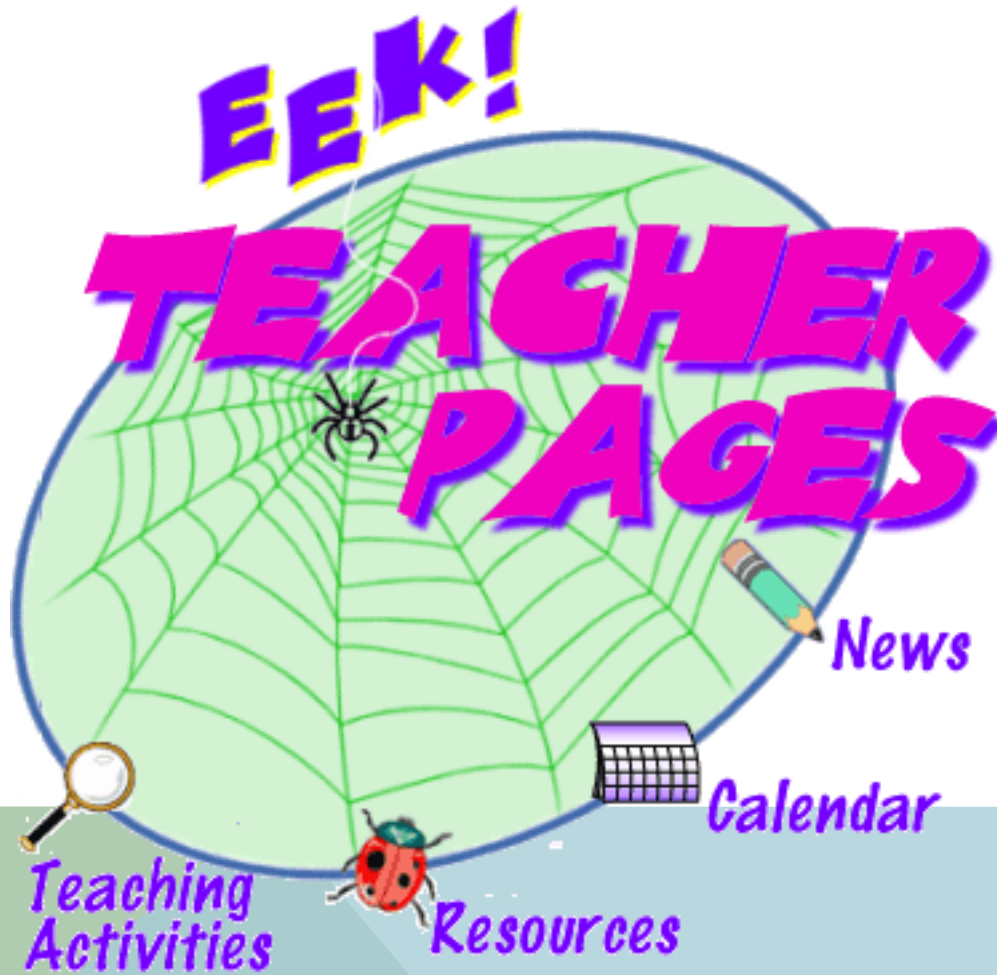
a positive experience with nature

Give Something to the Volunteers

**CRAFTS WORKSHOP: GARDEN ART WITH
INVASIVE PLANTS
SATURDAY, NOV 07 - 10:00AM-1:00PM WAVE
HILL HOUSE**



INVADERS OF THE FOREST



REVIEW LOCAL ORDINANCES:

WEEDS

TREES



CONSULTATIONS OR SITE VISITS



Pound Ridge

LOOSE CHANGE Last chance! Saturday, Oct. 10, is the last day to view the SheilArt exhibition at the Pound Ridge Library. It features textural mixed medium, watercolor, acrylic and collage artworks by the artist Sheila Mancini.

Designs

By **CHELSEA FINGER**
 More than 16 months after becoming principal of John Jay High School, Godin has resigned.
 Friday, Oct. 16, Katonah-Lewiston Superintendent of Schools Andrew Selesnick sent a message to families of John Jay High School students announcing her resignation. Mr. Selesnick's message said Ms. Godin resigned "for personal reasons."

...have immediately begun the process of filling the vacancy and expect to share more details with you in the coming days.'

— **ANDREW SELESNICK**,
 SUPERINTENDENT OF SCHOOLS

Ms. Godin's departure comes less than 16 months into the school year. She served in the Katonah-Lewiston School District as principal of Katonah Elementary School for three

Selesnick's statement he hopes we recognize that some members of the community will have questions about Ms. Godin's departure.

Neighbors enlist in invasives battle

By **DON HEPPNER**
 Carrie Sears, a Pound Ridge Conservation Board member and founder of The Invasives Project-Pound Ridge, detests invasive species, and her determination to rid the town of the blight seems to be sparking a contagion of its own.

Two High Ridge Road neighbors, Christine Morris and Connie Marchetti, did not know each other until they met at an early September TIP-PR function controlling Japanese stiltgrass in the East Woods Preserve.

It didn't take long before they agreed they needed to do something about the Japanese knotweed in their own neighborhood. "I had seen Christine out working in her yard and I admired what she had done," Ms. Marchetti said on Thursday morning. "I admired her work ethic and her energy, and it was nice to meet someone on the same page as I am."

People stop and ask the two women if they are for hire as they labor along the side of the road. "I guess we have become an oddity in Pound Ridge," Ms. Marchetti added.

Since they started working together, the project begun by Ms. Marchetti and Ms. Morris has become an official TIP-PR undertaking as a demonstration of roadside management, with the long-term goal of rehabilitating the area. "This is a three-year project, and their commitment to the task is admirable," Ms. Sears said. The project



Christine Morris and Connie Marchetti, High Ridge Road neighbors, are working long hours to remove Japanese knotwood along sections of the busy road. Their project now is an official undertaking of The Invasives Project.

DON HEPPNER PHOTO

along High Ridge Road, Ms. Sears was concerned about the neighbors' safety as they went about their work to elim-

the long-term nature of the project. "This noxious weed damages the road surface by growing through it

fore the roots die off. An alternative method to control the weed is to treat the stems after cutting with a poisonous agent, but each stem would need treatment. "The easiest method of control is to cut the plants and haul away the stems," she said, "but it's a lot of work."

The letter assures residents that other plants will not be cut, chemicals will not be used and debris will be disposed of properly. Ms. Sears also explained in the letter that the weed removal program will continue into the spring.

"This is a large volunteer undertaking and your support of this project is welcomed," the letter states.

The work begun by the two High Ridge neighbors is already making a visible difference.

"Right now, the change to the roadside is dramatic," Ms. Sears said. "These two women are transforming the roadside in a short period of time that includes only a few hours over a few days in September and October. It is amazing to see what they are doing during the first phase."

Without the weeds to hold them in place, the area would be subject to erosion, Ms. Sears explained. Volunteers intend to sow winter temporary cover and erosion control. Eventually, native plants will take the weeds.

Ms. Sears is organizing a volunteer day on Saturday, Oct. 31, and is looking for more volunteers.

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5

Continued on page 4

SOCIAL MEDIA



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USE THE RESOURCES AVAILABLE TO YOU.

JOIN THE LOWER HUDSON PRISM



**LOWER
HUDSON**

PRISM

Funding

Request literature.



TAKE PHOTOS.



DOCUMENT, DOCUMENT, DOCUMENT



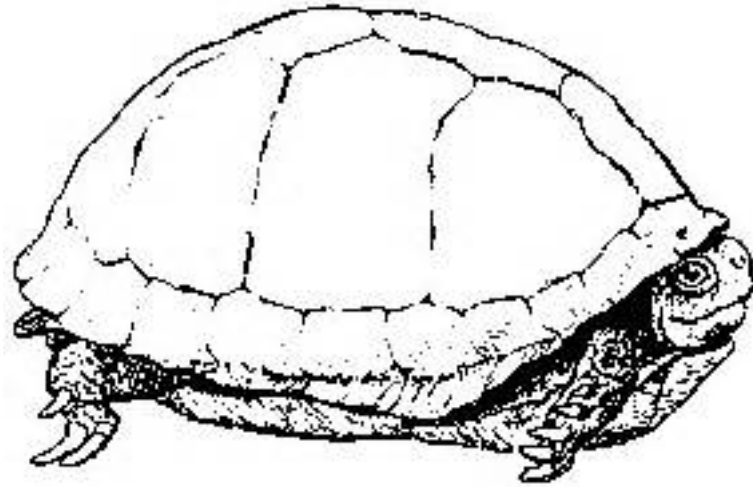


**WINTERS
BROS.**
Recycling For A Healthier Connecticut
(203) 743-0405



YOU WILL BECOME A PRESENCE

THERE WILL BE THOSE DAYS...

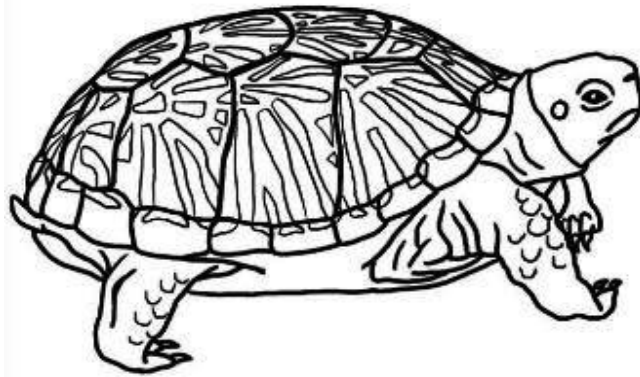


SET BOUNDARIES.

Resource:

neighborhoodconnected.net

KNOW WHEN TO SAY,



YES!

NYBG/125

INVASIVE SPECIES SUMMIT:
CHALLENGES, STRATEGIES,
AND PERSPECTIVES

FRI, NOV 6, 2015

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Partnership for Regional Invasive
Species Management



NEW YORK BOTANICAL GARDEN

