Invasive Species Management: Some Particulars

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Penn State University

PENNSTATE

1855

Wildland Weed Management
College of Agricultural Sciences
plantscience.psu.edu/wildland

pennsylvania
DEPARTMENT OF CONSERVATION
AND NATURAL RESOURCES
www.dcnr.state.pa.us

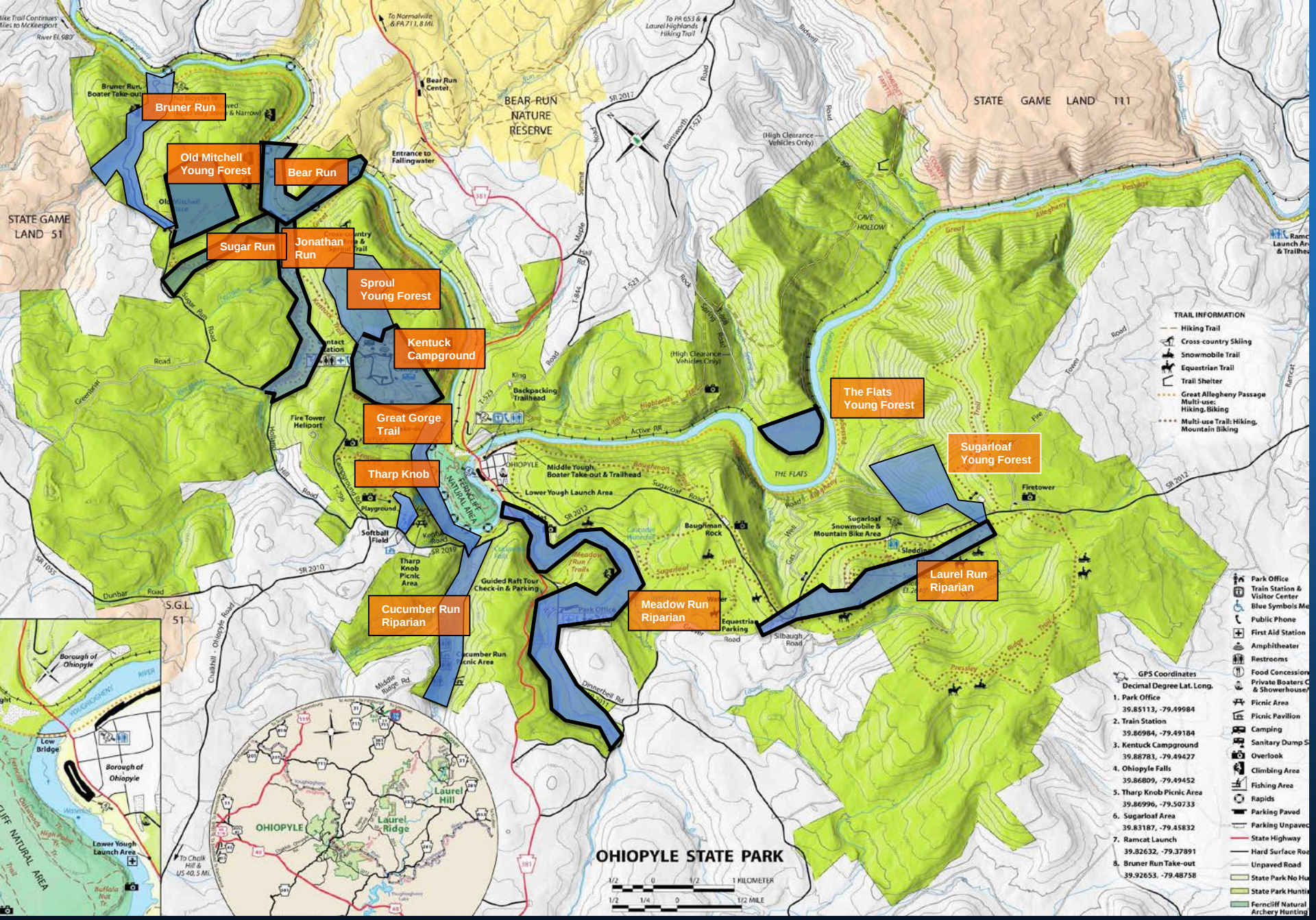
DCNR

Acknowledgement

- PA DCNR, Bureau of State Parks, Resources Management Section
  - Invasive Species and Habitat Management planning & implementation, operational training, classroom training, weed control research

Basics

- Planning
- Prescription
- Implementation


Bruner Run
Old Mitchell Young Forest
Bear Run
Sugar Run
Jonathan Run
Sproul Young Forest
Kentuck Campground
Great Gorge Trail
Tharp Knob
Cucumber Run Riparian
Meadow Run Riparian
The Flats Young Forest
Sugarloaf Young Forest
Laurel Run Riparian
BEAR RUN NATURE RESERVE
STATE GAME LAND 111
STATE GAME LAND 51
OHIOPYLE STATE PARK
TRAIL INFORMATION
Hiking Trail
Cross-country Skiing
Snowmobile Trail
Equestrian Trail
Trail Shelter
Great Allegheny Passage Multi-use: Hiking, Biking
Multi-use Trail: Hiking, Mountain Biking
GPS Coordinates
Decimal Degree Lat. Long.
1. Park Office 39.85113, -79.49984
2. Train Station 39.86984, -79.49184
3. Kentuck Campground 39.88783, -79.49427
4. Ohiopyle Falls 39.86809, -79.49452
5. Tharp Knob Picnic Area 39.86996, -79.50733
6. Sugarloaf Area 39.83187, -79.45832
7. Ramcat Launch 39.82632, -79.37891
8. Bruner Run Take-out 39.92653, -79.48758

HMZ Name	Great Gorge CRA	Ferncliff NA	Scours	Old Mitchell	Bear Run	Sproul	Cucumber Run	Meadow Run	Laurel Run	Middle Yough	Lower Yough	GAP	Bruner Run	Sugar Run	Jonathan Run	Sugarloaf	Kentuck	The Flats	Cucumber Picnic	Tharp Knob
Habitat Type	MF	MF	RC	YF	MF	YF	RC	RC	RC	RC	RC	MF	RC	RC	RC	YF	MF	YF	MF	YF
Stewardship Index	2	2	2	1	2	1	2	2	2	2	2	1	2	2	2	0	0	1	1	0
Outreach Index	2	2	2	2	1	2	1	1	1	1	1	2	0	0	0	2	1	0	0	0
Species	**SITE-BY-SPECIES PRIORITIZATION (0-10)**																			
Japanese stiltgrass	6	0	0	0	0	0	0	5	0	0	0	5	0	0	0	0	3	0	0	0
exotic biennials	8	0	8	0	0	0	0	0	0	0	0	5	0	0	0	6	5	0	5	4
Japanese knotweed	0	8	0	0	0	0	0	0	0	8	8	0	0	0	0	0	0	0	0	0
common reed	0	0	0	0	0	0	0	0	0	0	0	6	0	0	0	0	0	0	0	0
hemlock wooly adelgid	0	8	0	0	0	0	4	4	0	0	0	0	0	0	0	0	0	0	0	0
emerald ash borer	0	8	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
purple loosestrife	0	0	8	0	0	0	0	7	0	0	7	0	0	0	0	0	0	0	0	0
exotic shrubs	0	9	9	8	8	8	8	8	8	8	8	7	0	7	7	7	4	6	5	3
Norway maple	0	0	0	0	0	0	0	0	0	0	0	8	0	0	0	0	0	0	0	0
tree-of-heaven	0	0	0	0	0	0	0	0	0	0	0	8	0	0	0	0	0	0	0	0
Oriental bittersweet	0	0	0	0	0	0	0	0	0	5	0	0	0	0	0	0	0	0	0	0

Invasive Species Management Priorities and Activities-Cook Forest State Park

Species	PMU	Method	Activity Periods											
			JAN	FEB	MAR	APR	MAY	JUN	JUL	AUG	SEP	OCT	NOV	DEC
Japanese knotweed	Clarion River Toms Run	SPRAY-FOLIAR												
reed canarygrass	Clarion River Toms Run	SPRAY-FOLIAR												
exotic shrubs	Clarion River River Cabins	CUT												
exotic shrubs	Clarion River River Cabins	SPRAY-FOLIAR												
poison hemlock garlic mustard bull thistle	Clarion River Tom's Run Seneca Forest	SPRAY-FOLIAR												
Canada thistle	Clarion River Tom's Run Seneca Forest	SPRAY-FOLIAR												
Oriental bittersweet	Clarion River	SPRAY-BASAL												
purple loosestrife	Clarion River	SPRAY-FOLIAR												

Invasive Species Management Priorities and Activities

Black Moshannon State Park

Priority Rank	*Habitat Management Zone*	*1° Species*	*Lead Worker*	*Method*	*Comments*
1	West Side Road	exotic biennials exotic shrubs	Certified Applicator	Foliar-AirStrike	
		exotic shrubs	Staff	Cut	w/ volunteers
		exotic shrubs	Staff	Planting	w/ volunteers
2	Moss-Hanne/Shirks/ Bog Natural Area	exotic biennials exotic shrubs	Certified Applicator	Foliar-AirStrike	
3	Sleepy Hollow/Cabin Colony	exotic shrubs/biennials	Certified Applicator	Foliar-AirStrike	
		HWA	Certified Applicator	HWA-Soil Injection	FPM + staff
4	Star Mill/Beaver	exotic biennials exotic shrubs	Certified Applicator	Foliar-AirStrike	
		oriental bittersweet	Staff	Cut	
5	Casanova/ campground	exotic biennials exotic shrubs	Certified Applicator	Foliar-AirStrike	
		oriental bittersweet	Staff	Cut	
6	Airport	exotic biennials exotic shrubs	Certified Applicator	Foliar-AirStrike	
7	Ski Slope/snowmobile	exotic biennials exotic shrubs	Certified Applicator	Foliar-AirStrike	
		stiltgrass	Certified Applicator	Foliar-Other	
8	Benner Run/Shingle Mill	exotic biennials exotic shrubs	Certified Applicator	Foliar-AirStrike	
		HWA	Certified Applicator	HWA-Soil Injection	FPM + staff
9	Hay Road	exotic shrubs	Certified Applicator	Foliar-AirStrike	
10	Maintenance	exotic shrubs	Certified Applicator	Foliar-AirStrike	
		reed canarygrass	Certified Applicator	Foliar-AirStrike	

Park:	Black Moshannon	Year:	2015

HMZ	1° Species	Activity (Method)	Timing*											
			JAN	FEB	MAR	APR	MAY	JUN	JUL	AUG	SEP	OCT	NOV	DEC
West Side Road	exotic biennials	Monitor												
		Foliar-AirStrike												
	exotic shrubs	Monitor												
		Cut												
		Foliar-AirStrike												
		Planting												
	HWA	Monitor												
		HWA-Soil Injection												
Moss-Hanne/Shirks/Bog Natural Area	exotic biennials	Monitor												
		Foliar-AirStrike												
	exotic shrubs	Monitor												
		Foliar-AirStrike												
Sleepy Hollow/Cabin Colony	exotic shrubs	Monitor												
		Foliar-AirStrike												
	exotic biennials	Monitor												
		Foliar-AirStrike												
	HWA	Monitor												
		HWA-Soil Injection												
Star Mill/ Beaver	exotic shrubs	Monitor												
		Foliar-AirStrike												
	exotic biennials	Monitor												
		Foliar-AirStrike												
	Oriental Bittersweet	Cut												
Casanova/Campground	Exotic Shrubs	Monitor												
		Foliar-AirStrike												
	Honeysuckle	Monitor					*							
		Foliar-AirStrike												
	Oriental Bittersweet	Cut												

Mitigating Factors

- ‘Bundling’
  - schedule operations to target many species
  - broad spectrum prescriptions
- ID Training
  - If we know *just enough* to prioritize a site, the operation will pick up unaccounted species

Management Techniques

- Cultural
- Mechanical
- Biological
- Chemical


FECON
T320


FECON


Foliar – low volume


hack and squirt


basal bark

Control Options

Treatment	Materials*
foliar	Rodeo + Garlon 3A, Garlon 3A + 2,4-D
hack-squirt	Rodeo, Garlon 3A
stump treatment	Rodeo, Garlon 3A, Pathfinder II
basal bark	Pathfinder II
preemergent	ProClipse, Pendulum

* or equivalent

Usual Suspects-Examples

annuals	Japanese stiltgrass
	mile-a-minute
biennials	poison hemlock
	teasel
herbaceous perennials	purple loosestrife
	black swallow-wort
creeping herbaceous perennials	Canada thistle
	Japanese knotweed
	reed canarygrass
non-suckering woody	exotic shrubs
	European alder
suckering woody	ailanthus
woody vines	Oriental bittersweet

Vegetation Growth Forms

Life Cycle	Activity	J	F	M	A	M	J	J	A	S	O	N	D
annual	PRE												
	POST												
biennial-1	POST												
biennial-2	POST												
herbaceous perennial	POST												
woody	FOLIAR												
	STEM												
suckering woody	FOLIAR												
	STEM												
woody vines	CUT												
	FOLIAR												


Japanese stiltgrass – *Microstegium vimineum*

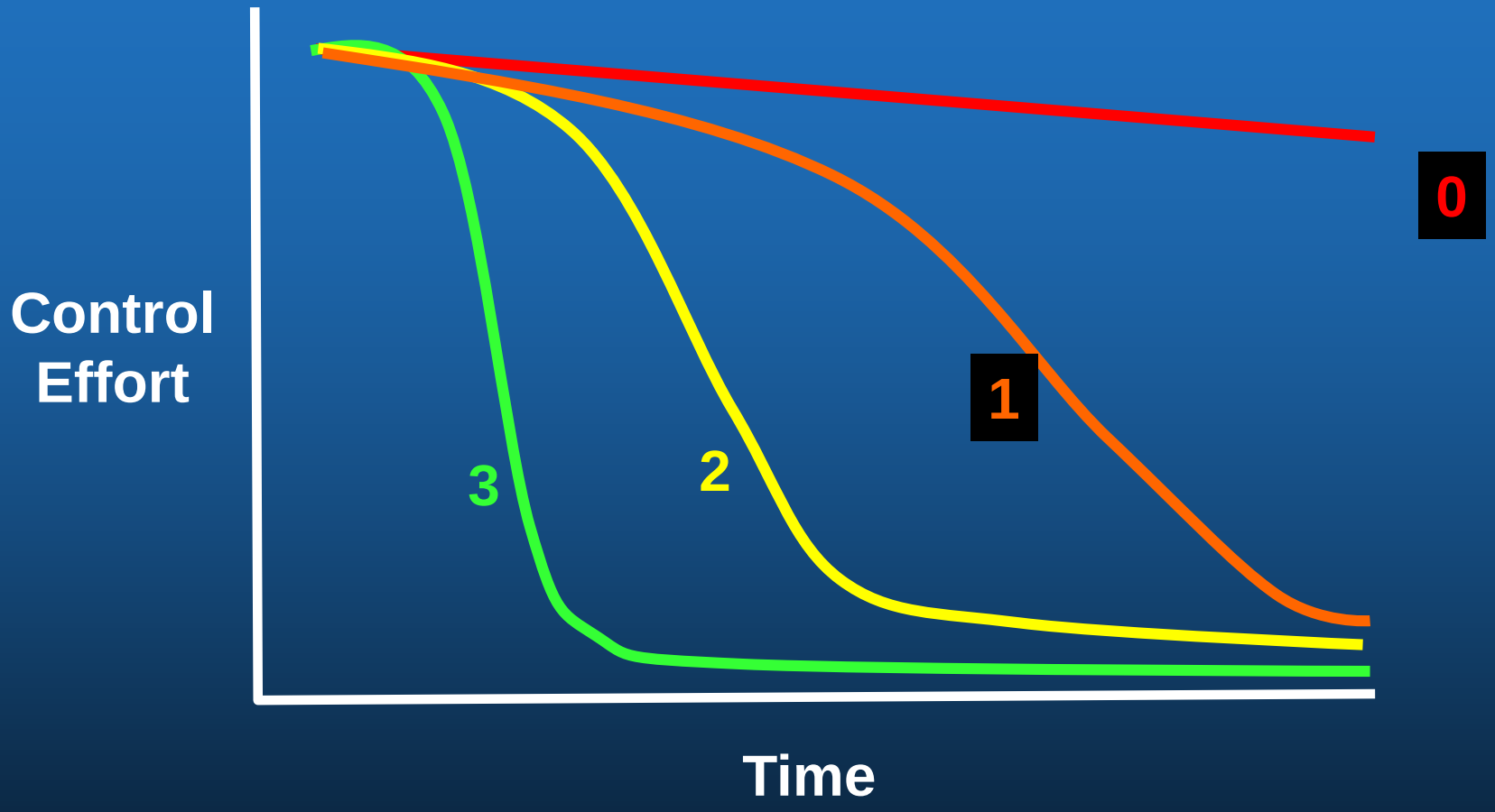

Japanese hops – *Humulus japonica*
AUG 23 2006


mile-a-minute
Persicaria perfoliata

Annuals Control Target

- **Seed bank**
  - **in practical terms, permanent**

Restoration Effort



Mile-a-minute - annual forb

germination

flowering, seed ripening

Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct

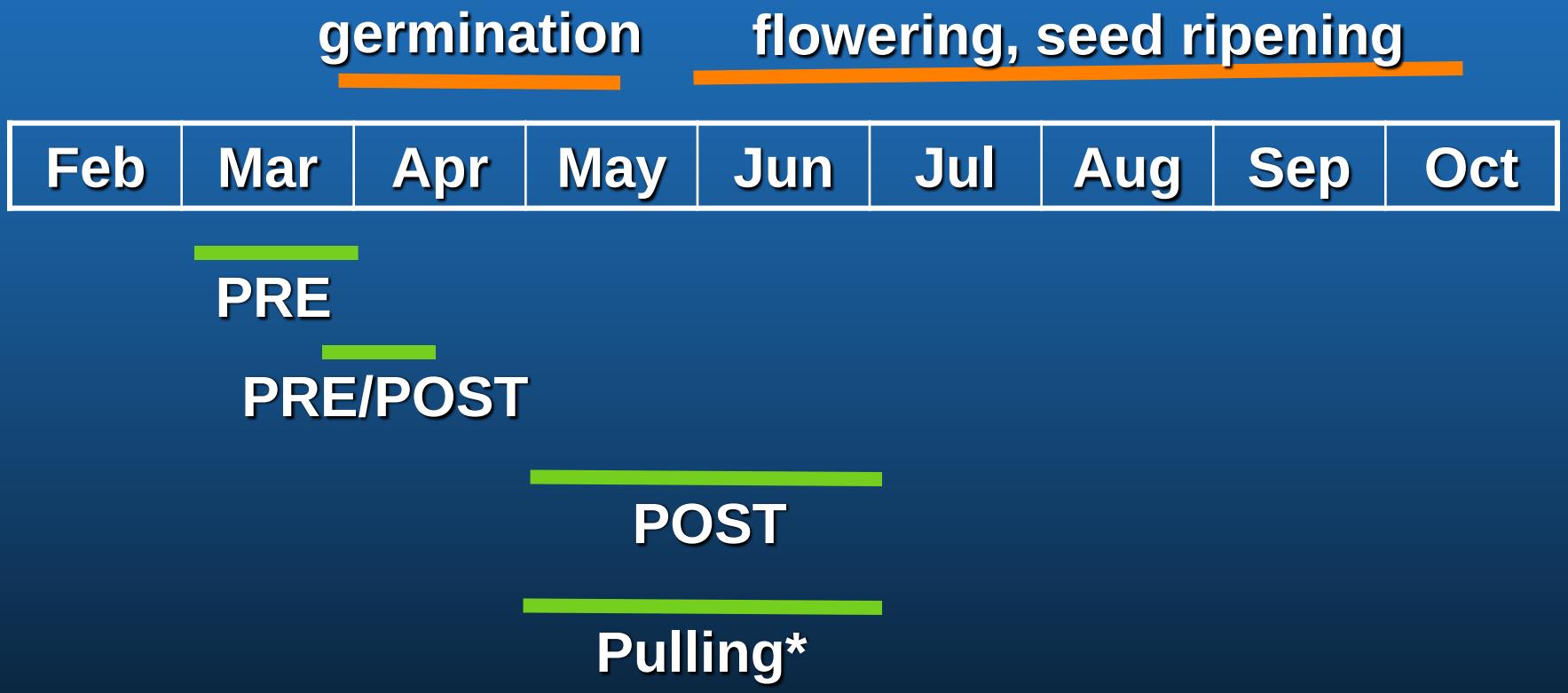

THIS
APR 7 2004


OR THIS
MAY 11 2004


EVEN THIS
JUN 10 2004


NOT THIS

Mile-a-minute



Herbicide Approaches

- **Preemergence (PRE)**
  - **targeting seedling**
- **Postemergence (POST)**
  - **seedling to flowering stage**

PRE – ProClipse + Plateau

PRE Herbicides

- Site labeling
- Selectivity
  - limit effect to germinating plants

PRE Herbicides

- Dinitroanalines (DiNA)
- ALS-inhibitors

Dinitroanalines

chemical name	product example
pendimethalin	Pendulum
prodiamine	ProClipse
oryzalin	Surflan

ALS-inhibitors

chemical name	product example
imazapic	Plateau
sulfometuron	Oust XP

ALS-inhibitors

- PRE and POST activity
- Less selective
- Foliar and root uptake


No treatment – 90 DAT


pendimethalin applied PRE


Oust XP applied PRE

PRE herbicides

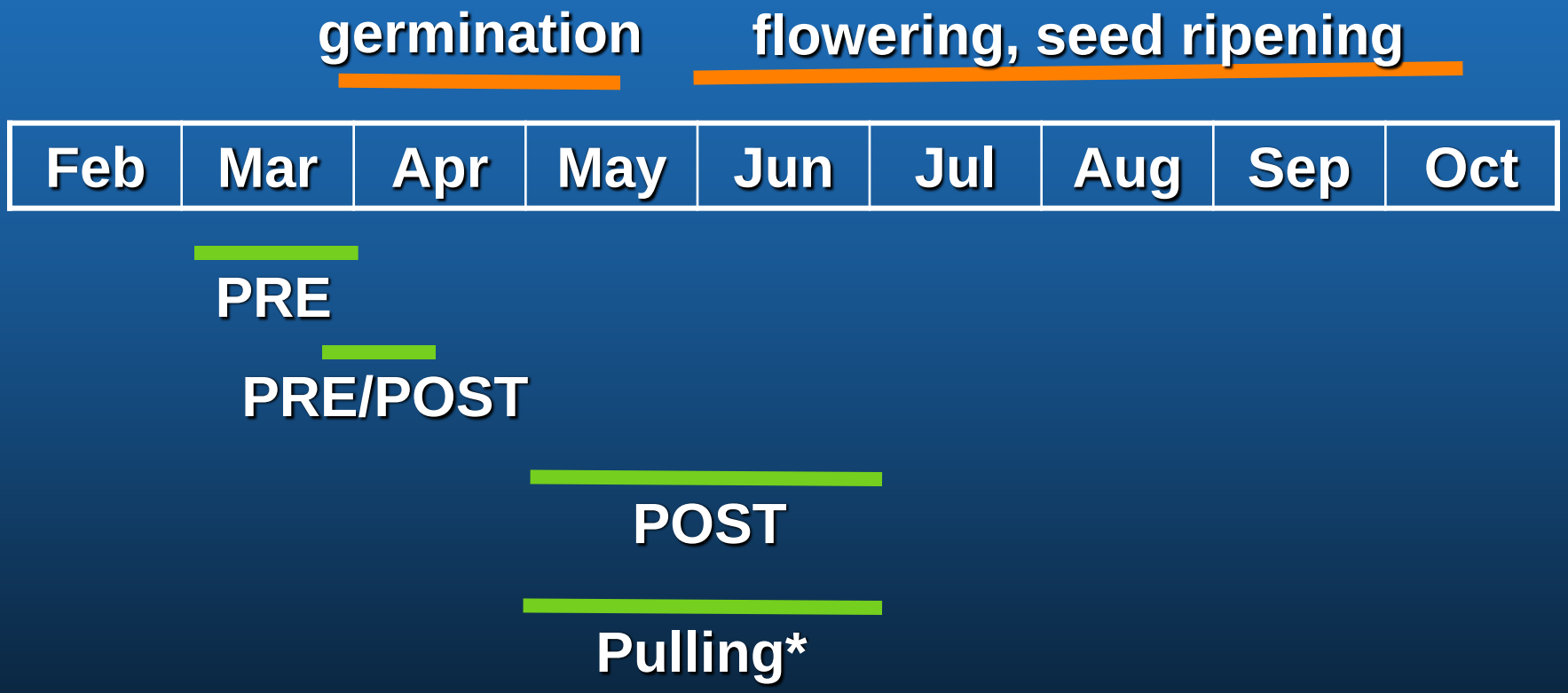
MAM germination

MAR	APR	MAY

DiNA

DiNA+imazapic

Mile-a-minute

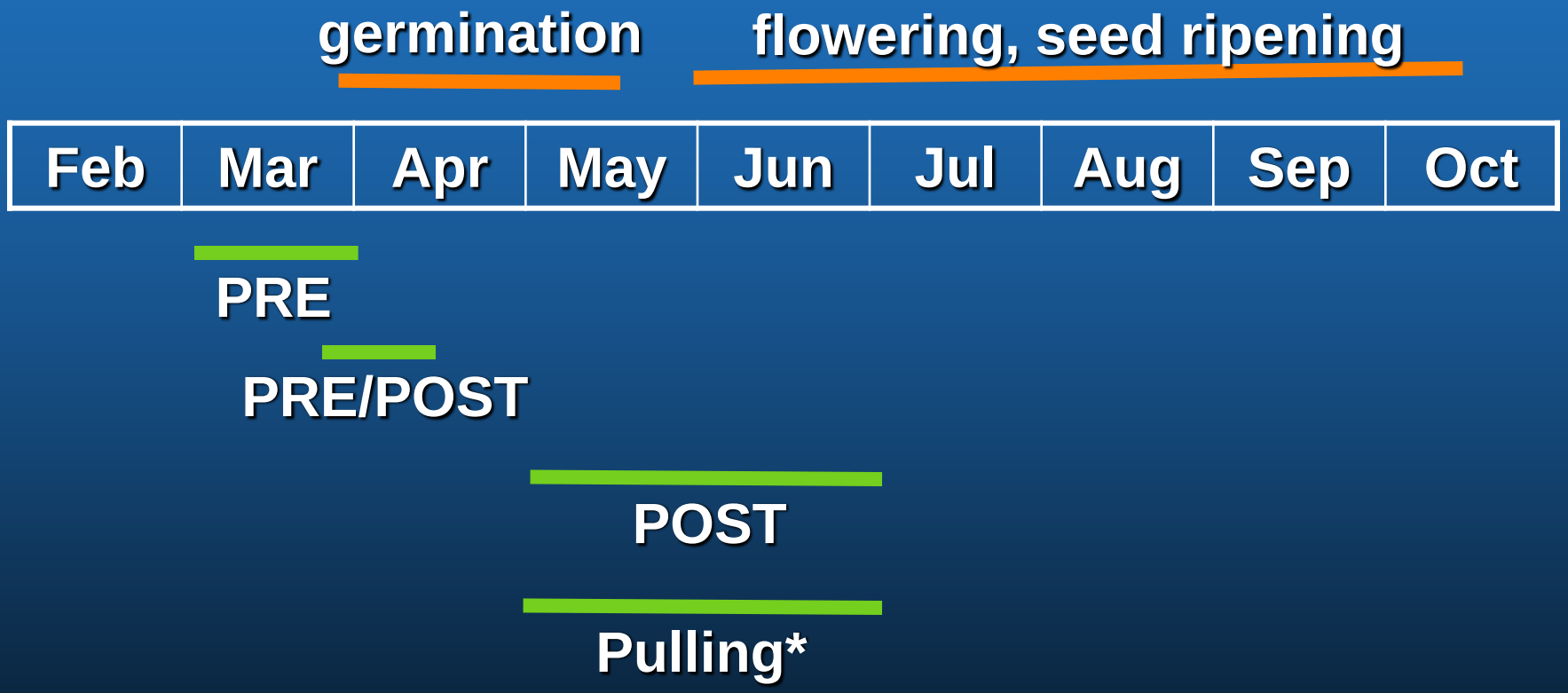


Use Mixes – More Targets

chemical name	product example
glyphosate + triclopyr	Rodeo + Garlon 3A
triclopyr + 2,4-D	Garlon 3A + 2,4-D
triclopyr + aminopyralid	Capstone*

* Aquatic registration in 2016

Mile-a-minute



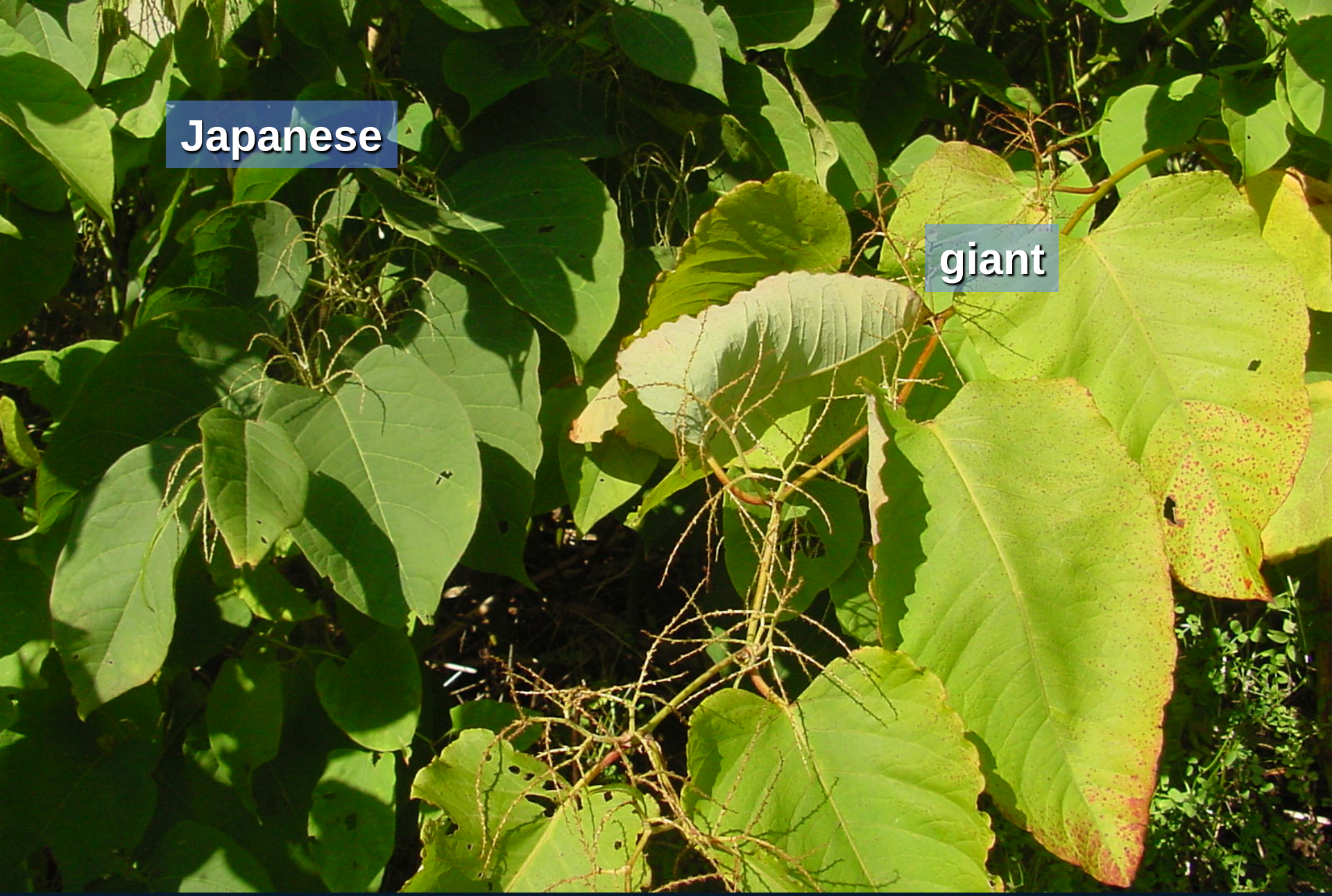

Japanese knotweed
Fallopia japnonicum S.L.

Vegetation Growth Forms

Life Cycle	Activity	J	F	M	A	M	J	J	A	S	O	N	D
annual	PRE												
	POST												
biennial-1	POST												
biennial-2	POST												
herbaceous perennial	POST												
woody	FOLIAR												
	STEM												
suckering woody	FOLIAR												
	STEM												
woody vines	CUT												
	FOLIAR												

Knotweed – Control Target

- Rhizome system
  - extensive
  - impacted most effectively by systemic herbicides
  - exhaustion through cutting unlikely



plus Bohemian knotweed!


Jenn Greiser, NYCDEP
A1197003

Japanese Knotweed - perennial forb

vegetative growth

seed ripening

Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct

Mowing for herbicide follow-up

FOLIAR- glyphosate

FOLIAR-following years

Herbicides

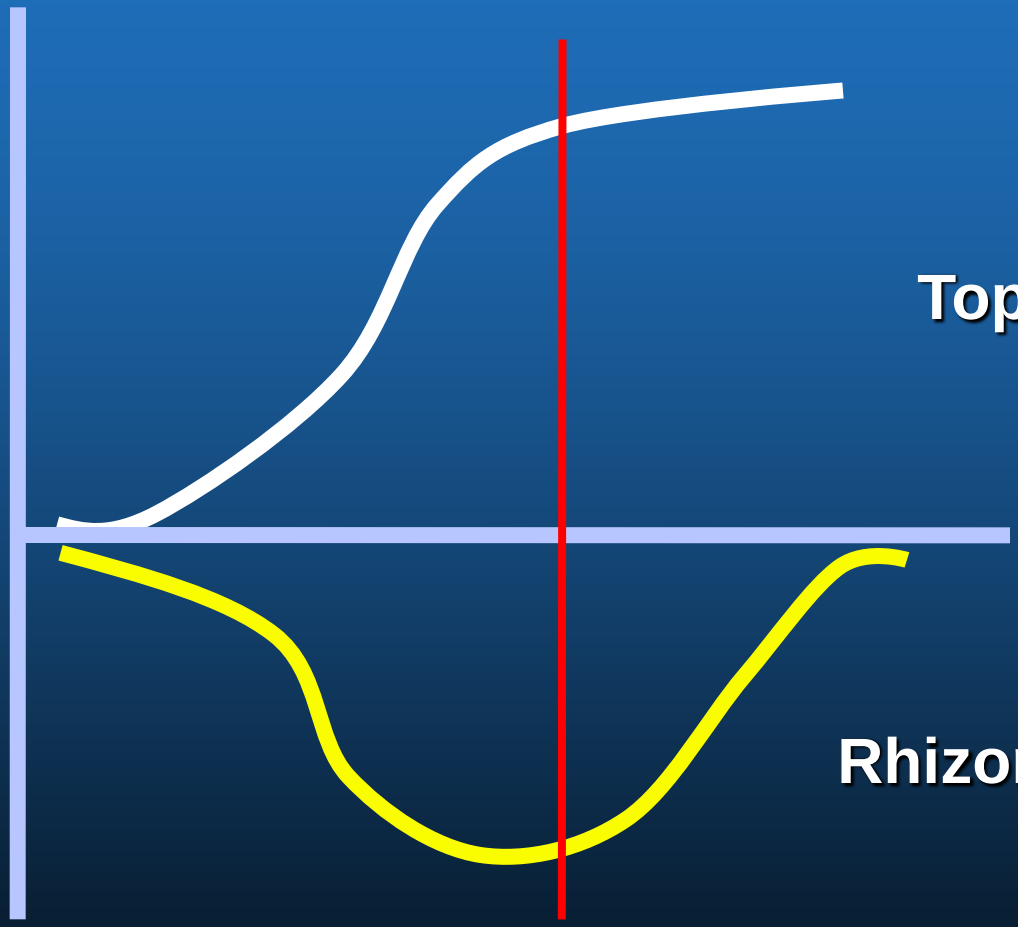
- ***Glyphosate*, alone or in mix**
- **That's it.**
  - ***imazapyr* – not better, higher risk**
  - ***triclopyr* – not effective**

Knotweed Reduction Approach – Two Phases

- Control Phase
  - Treat Year 1
  - Follow-up Year 2
- Maintenance Phase
  - periodic treatment of remnant knotweed


Cutting

WAIT! (≈ 8 weeks)



Follow-up

- Continue treatment to 'release' desirable vegetation

- or -

- Install desirable vegetation and continue to manage


tree-of-heaven
Ailanthus altissima
(root suckering woody)

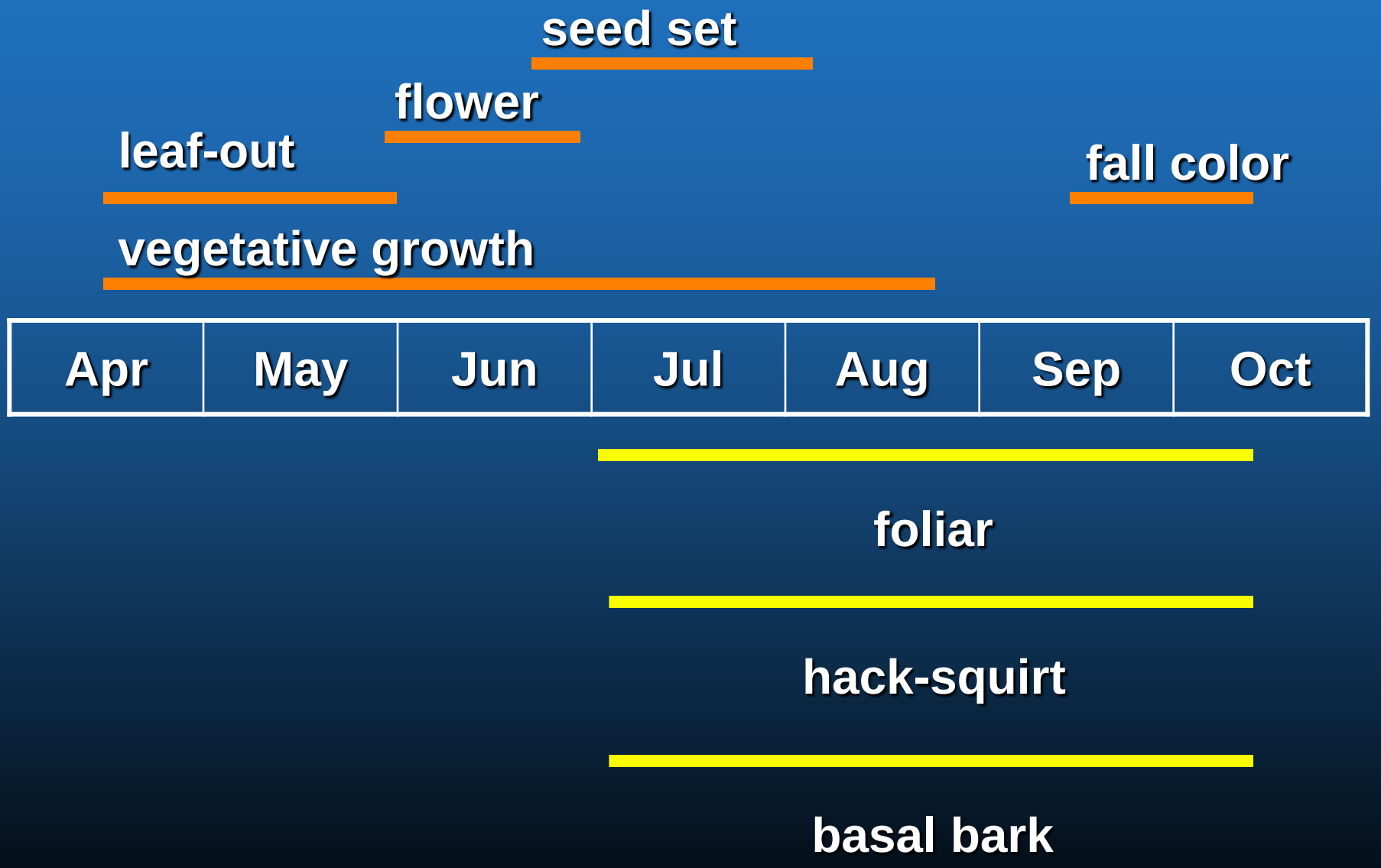
Vegetation Growth Forms

Life Cycle	Activity	J	F	M	A	M	J	J	A	S	O	N	D
annual	PRE												
	POST												
biennial-1	POST												
biennial-2	POST												
herbaceous perennial	POST												
woody	FOLIAR												
	STEM												
suckering woody	FOLIAR												
	STEM												
woody vines	CUT												
	FOLIAR												

Ailanthus – Control Target

- Root system
  - extensive
  - most impact through systemic herbicides

Ailanthus - suckering tree




JUN 30 2004


JUN 29 2004


SEP 27 2004


SEP 27 2004


JUL 14 2008


JUL 14 2008

Vegetation Growth Forms

Life Cycle	Activity	J	F	M	A	M	J	J	A	S	O	N	D
annual	PRE												
	POST												
biennial-1	POST												
biennial-2	POST												
herbaceous perennial	POST												
woody	FOLIAR												
	STEM												
suckering woody	FOLIAR												
	STEM												
woody vines	CUT												
	FOLIAR												