
North Carolina Sandhills
Weed Management Area
Tracy Rush – Program Coordinator

Weed Management Area

- Partnership of federal, state and local government agencies; conservation organizations; individuals and other interested groups that cooperatively manage invasive plants in a defined area.

Partners

- U.S. Department of Defense
- U.S. Fish and Wildlife Service
- U.S.D.A. Natural Resources Conservation Service
- N.C. Division of Parks and Recreation
- N.C. Wildlife Resources Commission
- The Nature Conservancy
- Sandhills Area Land Trust
- Sandhills Ecological Institute
- Private commercial foresters
- Private landowners/Interested parties

Advantages of WMA

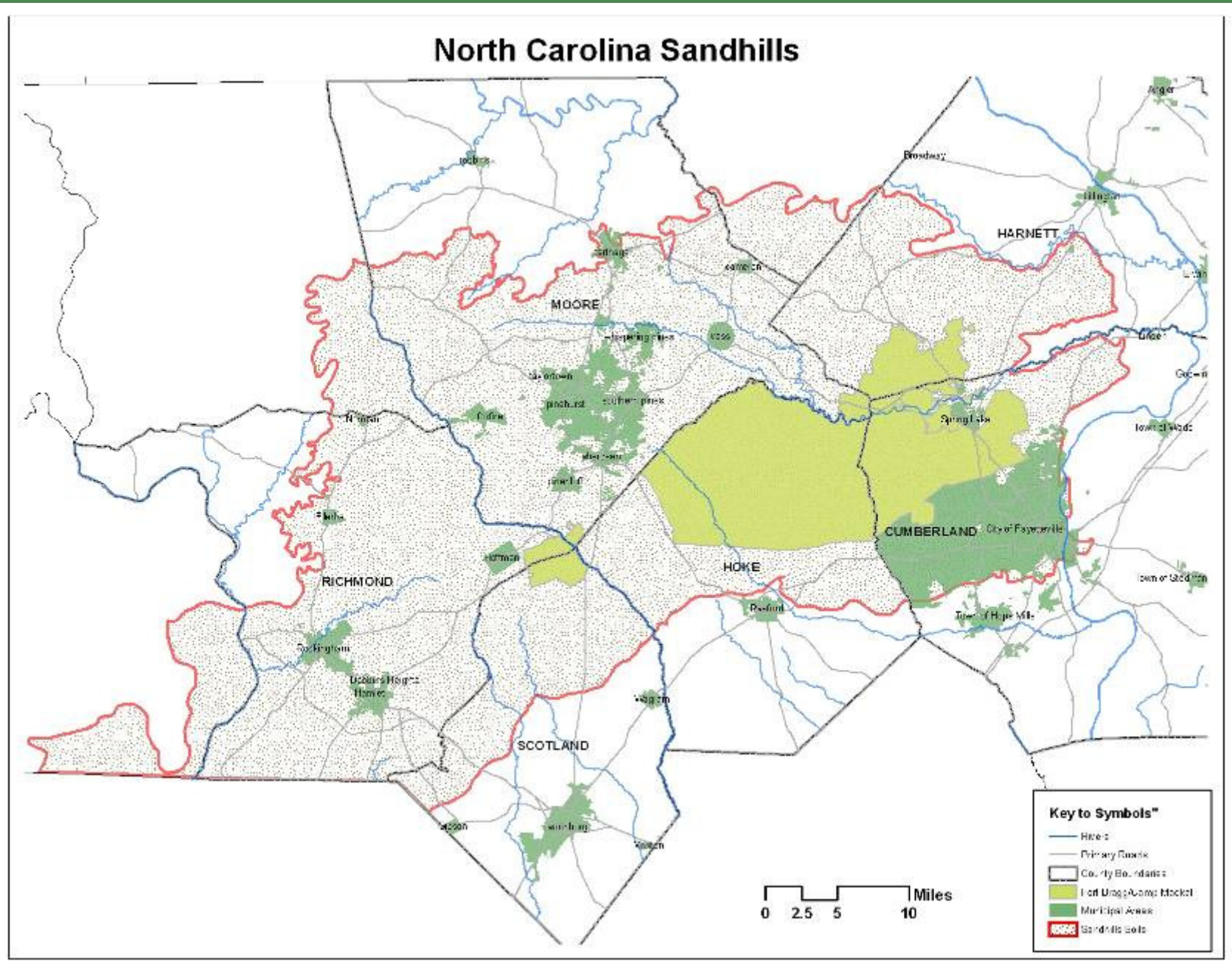
- Management can occur across jurisdictional boundaries.
- Costs and management burdens are reduced for each individual landowner.
- Share data and resources.
- More access to various funding sources.

Establishment of the Sandhills Weed Management Area

- An invasive plant survey of Fort Bragg and Camp Mackall indicated the occurrence of at least 51 invasive plants.
- The military reservations initiated a large-scale invasive plant management program to prevent these 51 species from damaging valuable natural resources and training lands.
- Supporting a WMA on surrounding lands would protect the significant investments these installations have made in invasive plant management.

Establishment of the Sandhills Weed Management Area

- Based on this information and various federal regulations requiring federal agencies to control invasive species, the U.S. Army Corps of Engineers, Engineering Research and Development Center (ERDC-CERL) secured funding from the Department of Defense Legacy Program to establish a WMA in the Sandhills in 2006.


North Carolina Sandhills
MOORE
HARNETT
CUMBERLAND
HOKE
RICHMOND
SCOTLAND
Miles
0 2.5 5 10
Key to Symbols**

Survey 2009-2010

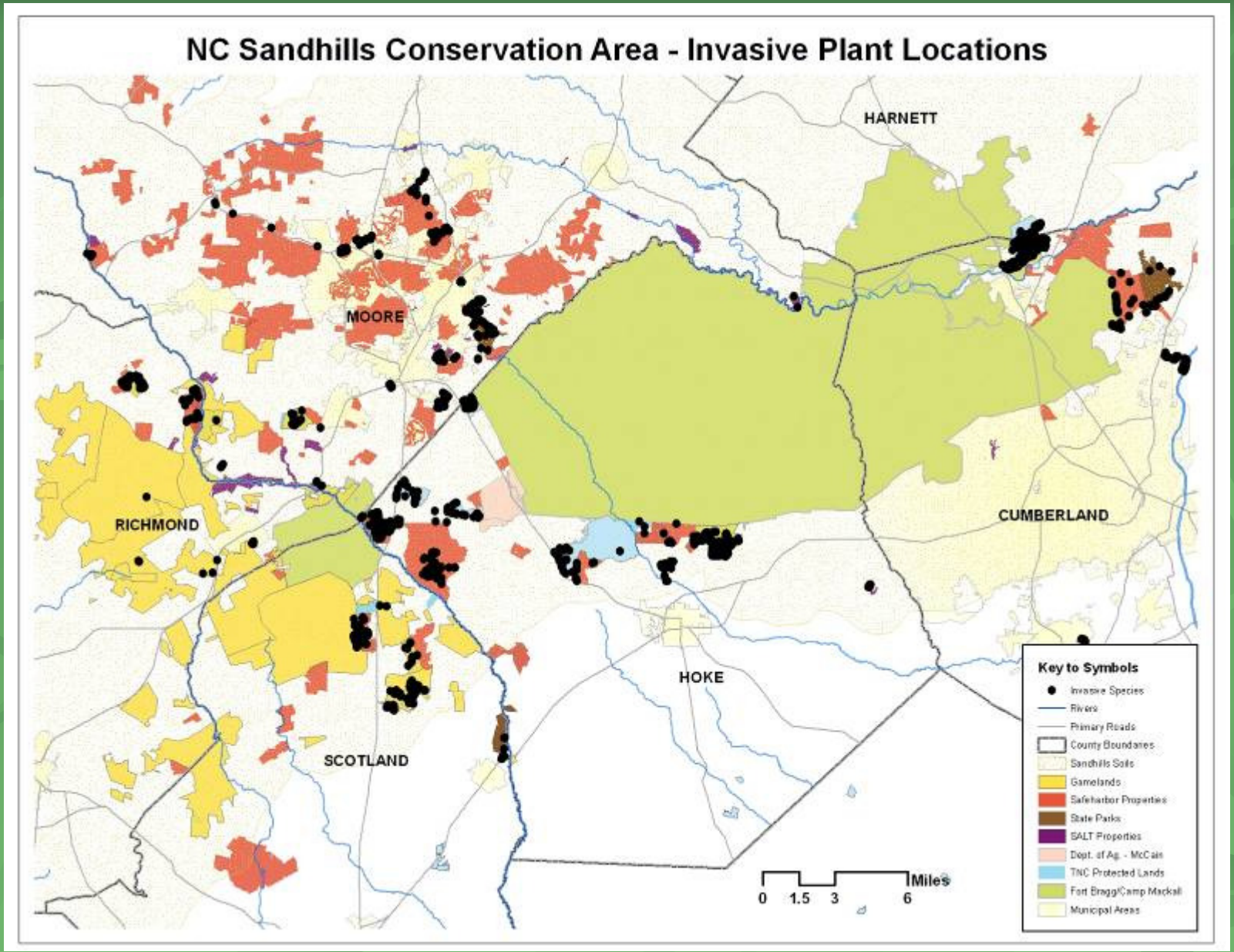
- Through the partners we were able to gain immediate access to a large number of properties.
- Surveyed 50+ properties for a total of 20,945 acres:
  - State Parks
  - The Nature Conservancy Preserves
  - Sandhills Area Land Trust parcels
  - Sandhills Game Lands parcels
  - Private Conservation Land

Notes on Surveys:

- Surveys focused on “conservation lands”.
- Properties were not 100% surveyed. Surveys focused on invasion corridors such as:
  - Roads
  - Railroads
  - Utility Right-of-ways
  - Old Homesites
  - Old Fields
  - Disturbed Areas
  - Property Boundaries

Mapping

- Mapped almost 1,800 occurrences of 35 different invasive plants on these properties.
  - Occurrences varying in size from a single plant to acre-size infestations.
- Used handheld Garmin GPS units.
- A data sheet was filled out for each occurrence.
  - Simple datasheet with check boxes.

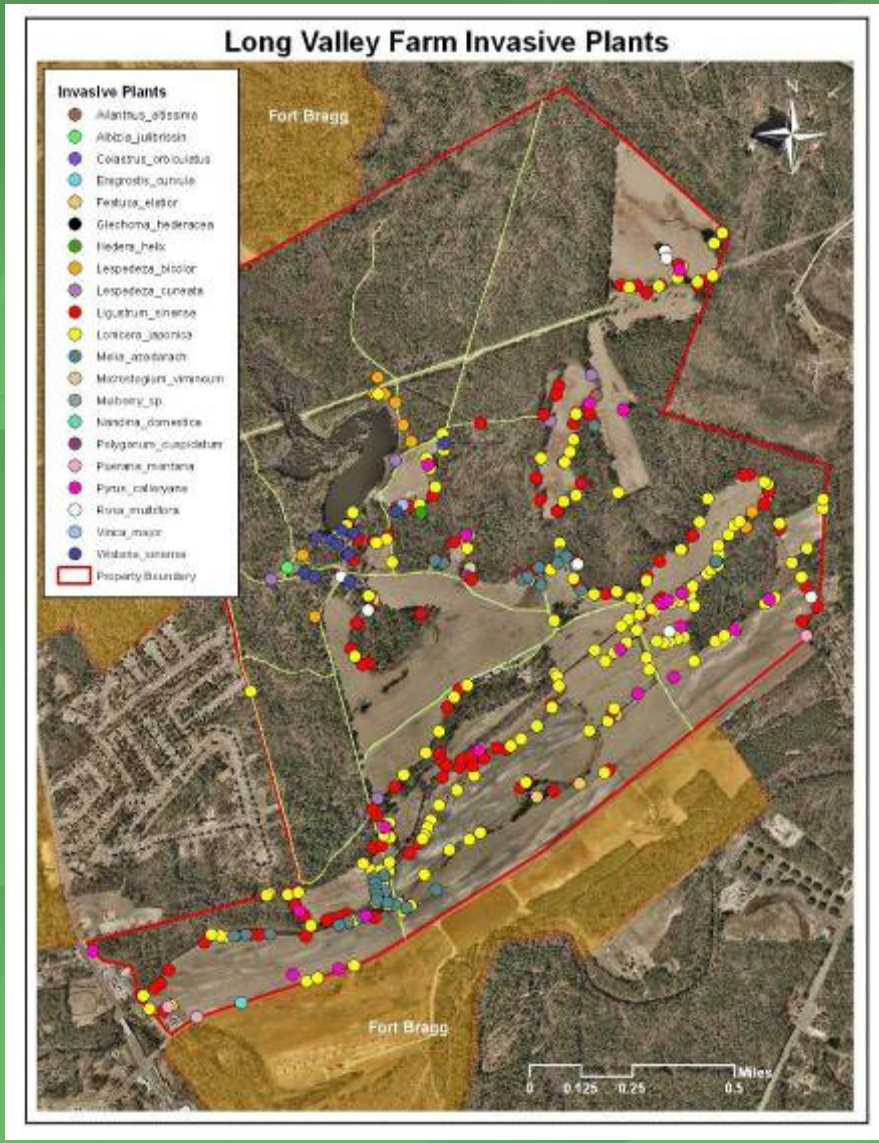

NC Sandhills Conservation Area - Invasive Plant Locations
HARNETT
MOORE
RICHMOND
CUMBERLAND
HOKE
SCOTLAND
0 1.5 3 6
Miles
Key to Symbols
Invasive Species
Rivers
Primary Roads
County Boundaries
Sandhills Soils
Gamelands
Safeharbor Properties
State Parks
SALT Properties
Dept. of Ag. - McCain
TNC Protected Lands
Fort Bragg/Camp Mackall
Municipal Areas

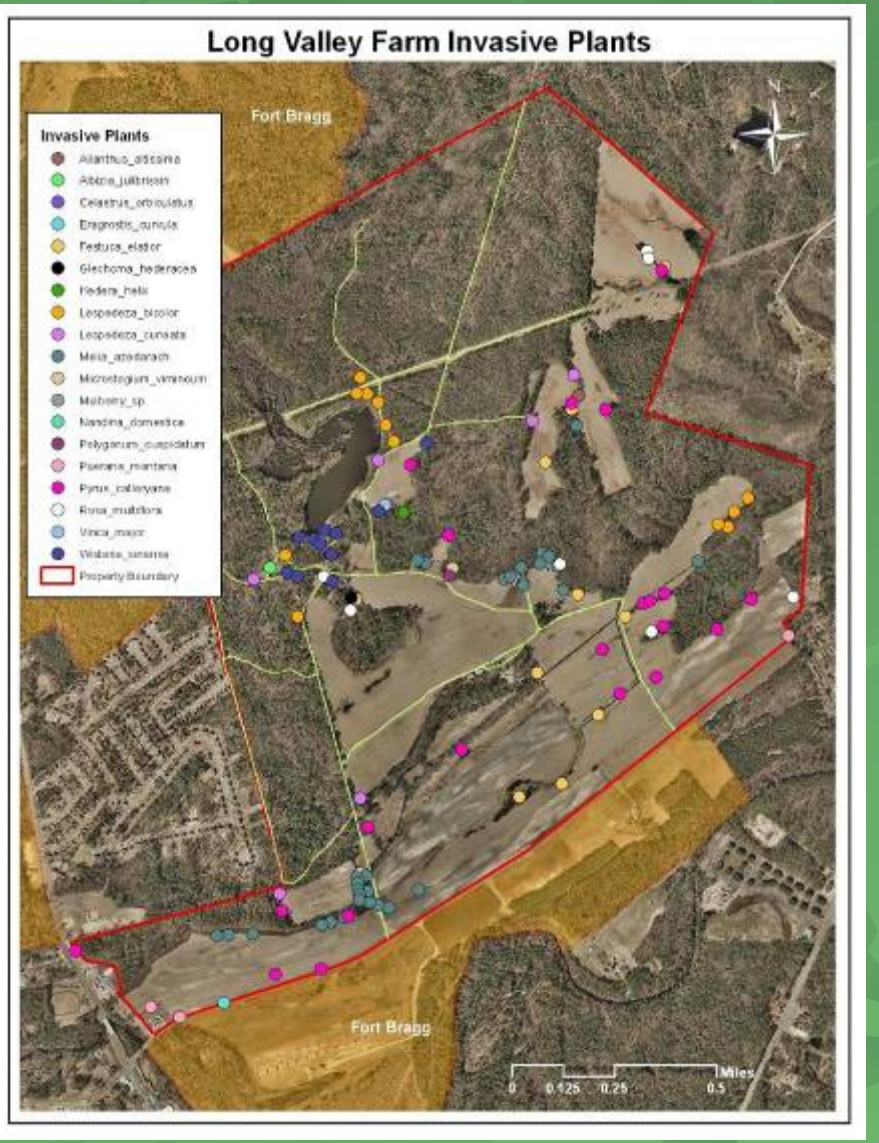
2009-2010 Breakdown

- 51% of the occurrences were Chinese Privet and Japanese Honeysuckle.
- 20% of the occurrences were “wildlife-related” (planted for food or cover):
  - Chinese Lespedeza = 7.2 % (full extent not mapped)
  - Shrubby Lespedeza = 4.5%
  - Multiflora Rose = 4.7%
  - Weeping Lovegrass = 4.3%
- Other most common species:
  - Chinaberry = 7.2%
  - Wisteria = 4.2%
  - Mimosa = 3.7%

Scientific Name	Common Name	Number of Occurrences	Percentage of Total Mapped
Ailanthus altissima	tree of heaven	34	1.89
Albizia julibrissin	mimosa, silk tree	67	3.73
Artemisia vulgaris	mugwort	2	0.11
Arundo donax	giant reed	1	0.05
Celastrus orbiculatus	Oriental bittersweet	1	0.05
Elaeagnus pungens	thorny olive	6	0.33
Elaeagnus umbellata	autumn olive	1	0.05
Eragrostis curvula	weeping lovegrass	78	4.34
Euonymus fortunei	wintercreeper	2	0.11
Festuca elatior	tall fescue	14	0.78
Glechoma hederacea	gill-over-the-ground	3	0.17
Hedera helix	English ivy	9	0.50
Ipomoea sp.	morning glory	3	0.17
Lespedeza bicolor	shrubby bushclover	80	4.45
Lespedeza cuneata	Chinese lespedeza	129	7.18
Ligustrum sinense	Chinese privet	462	25.70
Ligustrum sp.	ornamental privet	1	0.05
Lonicera japonica	Japanese honeysuckle	448	24.96
Lonicera sp.	bush honeysuckle	4	0.22

Scientific Name	Common Name	Number of Occurrences	Percentage of Total Mapped
Melia azedarach	chinaberry	129	7.18
Microstegium vimineum	Japanese stilt grass	33	1.84
Miscanthus sinensis	zebra grass	2	0.11
Morus alba	white mulberry	3	0.17
Murdannia keisak	marsh dewflower	23	1.28
Nandina domestica	sacred bamboo	9	0.50
Paulownia tomentosa	princesstree	11	0.61
Phyllostachys aurea	bamboo	1	0.05
Polygonum cuspidatum	Japanese knotweed	8	0.44
Pueraria montana	kudzu vine	17	0.95
Pyrus calleryana	Bradford pear	32	1.78
Rosa multiflora	multiflora rose	84	4.67
Senna obtusifolia	sicklepod	8	0.44
Sorghum halepense	johnsongrass	13	0.72
Vinca spp.	periwinkle	2	0.11
Wisteria spp	wisteria	75	4.17


Long Valley Farm Invasive Plants
Invasive Plants
Ailanthus_altissima
Albizia_julibrissin
Celastrus_orbiculatus
Eragrostis_curvula
Festuca_elatior
Glechoma_hederacea
Hedera_helix
Lespedeza_bicolor
Lespedeza_cuneata
Ligustrum_sinense
Lonicera_japonica
Melia_azedarach
Microstegium_vimineum
Mulberry_sp.
Nandina_domestica
Polygonum_cuspidatum
Pueraria_montana
Pyrus_calleryana
Rosa_multiflora
Vinca_major
Wisteria_sinensis
Property Boundary
Fort Bragg
Fort Bragg
0 0.125 0.25 0.5
Miles


Long Valley Farm Invasive Plants
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Ailanthus_altissima
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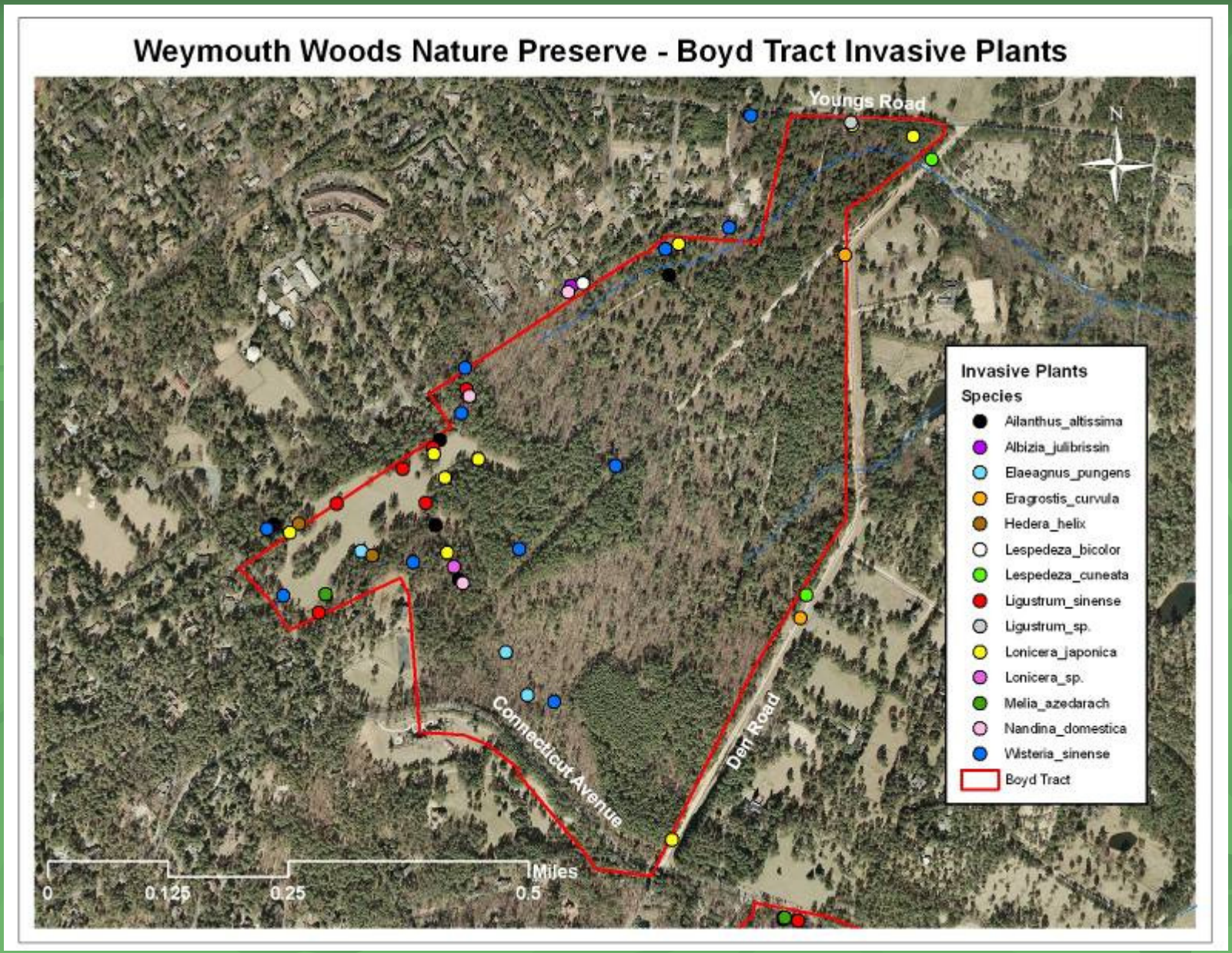
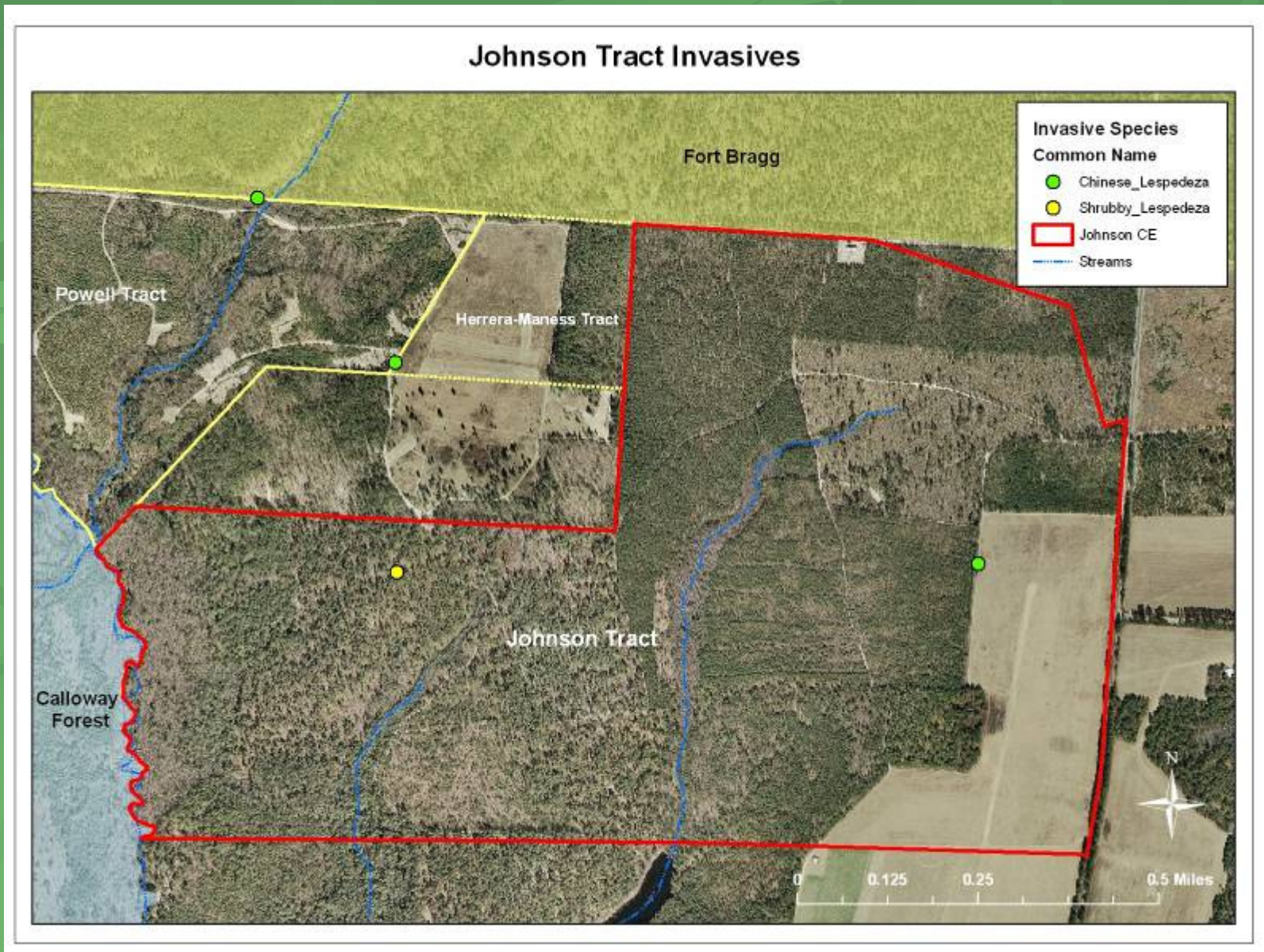
Property Boundary
Fort Bragg
Fort Bragg
0 0.125 0.25 0.5
Miles


Weymouth Woods Nature Preserve - Boyd Tract Invasive Plants
Youngs Road
N
Connecticut Avenue
Dent Road
Invasive Plants
Species
Ailanthus_altissima
Albizia_julibrissin
Elaeagnus_pungens
Eragrostis_curvula
Hedera_helix
Lespedeza_bicolor
Lespedeza_cuneata
Ligustrum_sinense
Ligustrum_sp.
Lonicera_japonica
Lonicera_sp.
Melia_azedarach
Nandina_domestica
Wisteria_sinense
Boyd Tract
Miles
0
0.125
0.25
0.5


Johnson Tract Invasives
Fort Bragg
Powell Tract
Herrera-Maness Tract
Johnson Tract
Calloway Forest
Invasive Species
Common Name
Chinese_Lespedeza
Shrubby_Lespedeza
Johnson CE
Streams
N
0
0.125
0.25
0.5 Miles

Invasives Treated

- In the past 2 years we have treated 456 occurrences (25% of all occurrences mapped) and some occurrences have been treated a number of times (169 occurrences have been treated at least twice).
  - Chinese privet and Japanese honeysuckle were treated if the occurrences were isolated or if the occurrences were immediately adjacent to other species.

Treatment Methods

- Herbaceous species:
  - Foliar spray with 2%+ glyphosate solution.
- Vines:
  - For large vines (>0.5 inch dbh) we used the "cut and spray" method on the first treatment. We cut the vine close to the ground and applied a concentrated glyphosate solution to the cut surface.
  - After 1 month or so, we treated any remaining foliage with a 4%+ glyphosate foliar spray.

Treatment Methods

- Shrubs:
  - For most shrubs we used the “cut and spray” method. But in a few cases the shrubs (multiflora rose) were too dense to get to the stems so then we used a 4%+ glyphosate foliar solution.
- Trees:
  - Saplings and small trees (<4 inch dbh) were treated using the “cut and spray” or “basal bark” methods.
  - Large trees were treated with the “hack and squirt” method whereby a chainsaw (most efficient) was used to “girdle” the trunk near the ground. Then we squirted a concentrated glyphosate solution into the cuts.

Parsons Tract - Before
NC Wildlife Resources Commission

Parsons Tract - After

NC Wildlife Resources Commission

After 3 Months….sprouts!!

Boyd Tract - Before

Weymouth Woods State Park

Boyd Tract - After

Weymouth Woods State Park

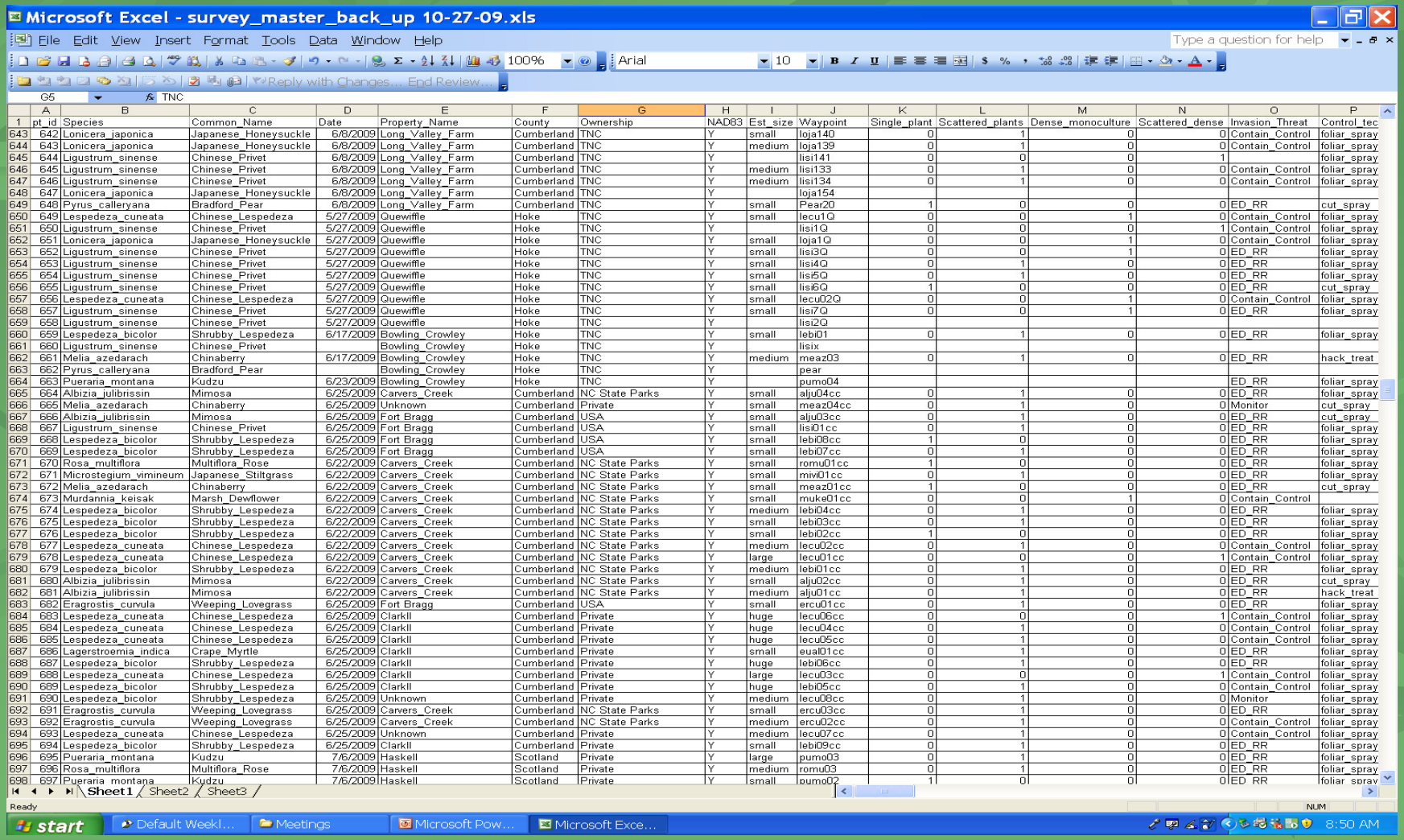
Game Lands - Before

NC Wildlife Resources Commission

Game Lands - After

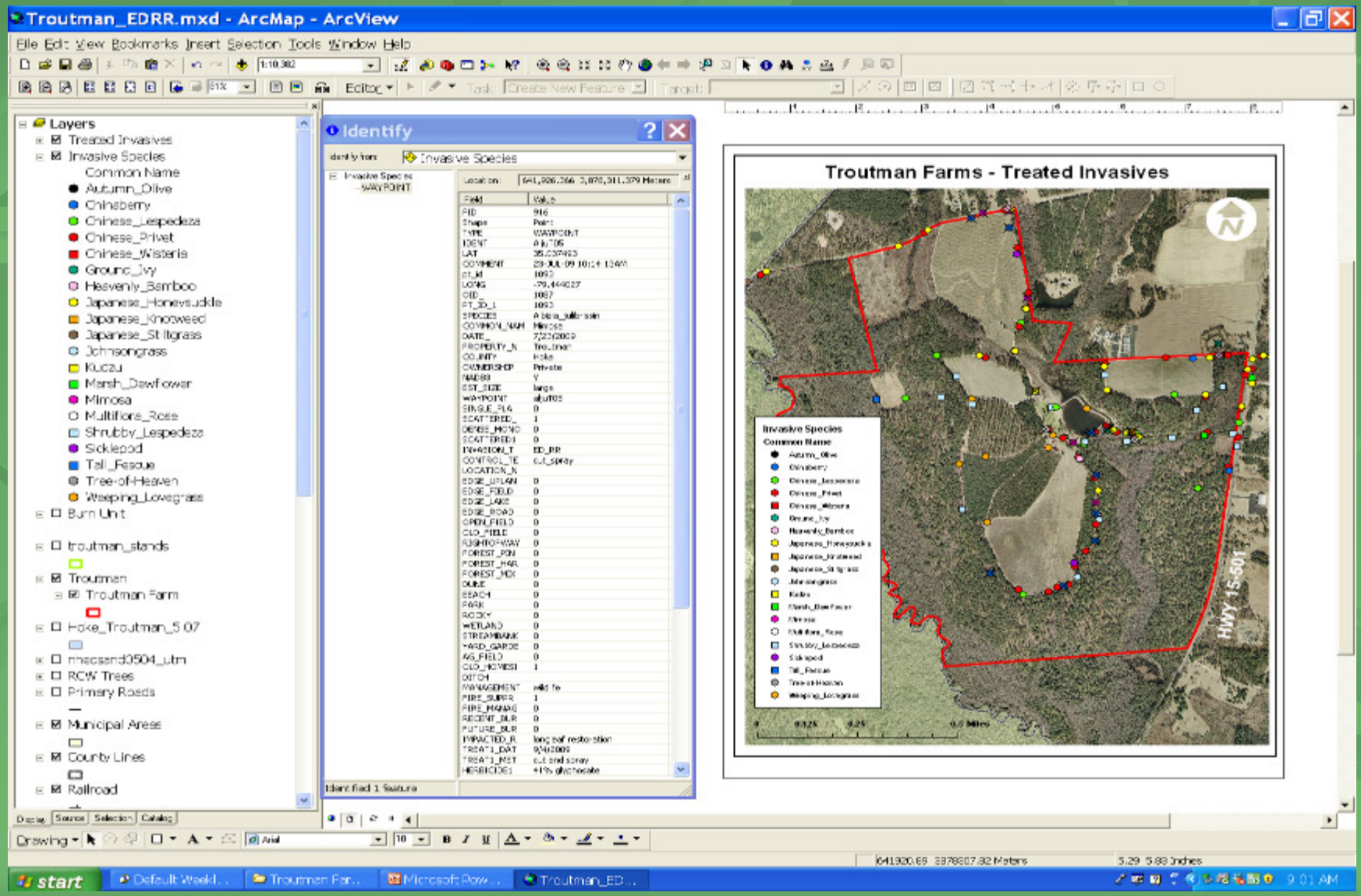
NC Wildlife Resources Commission

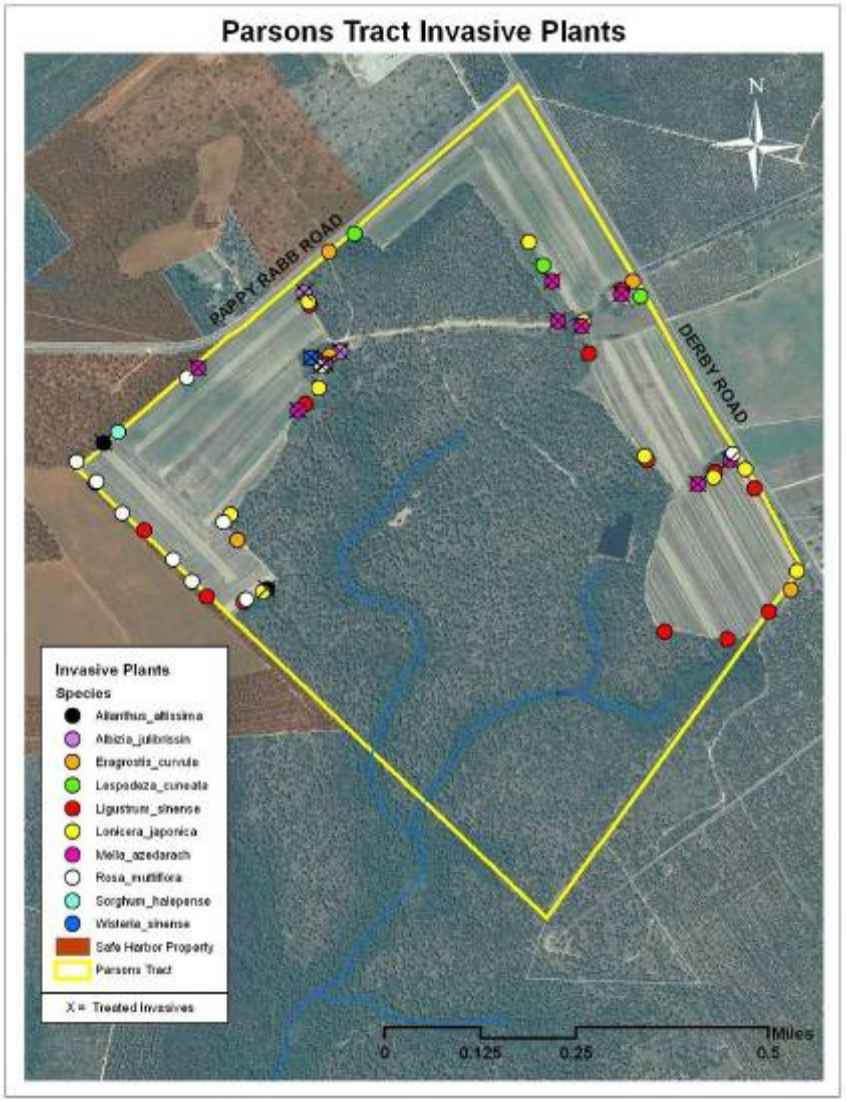
Data Management

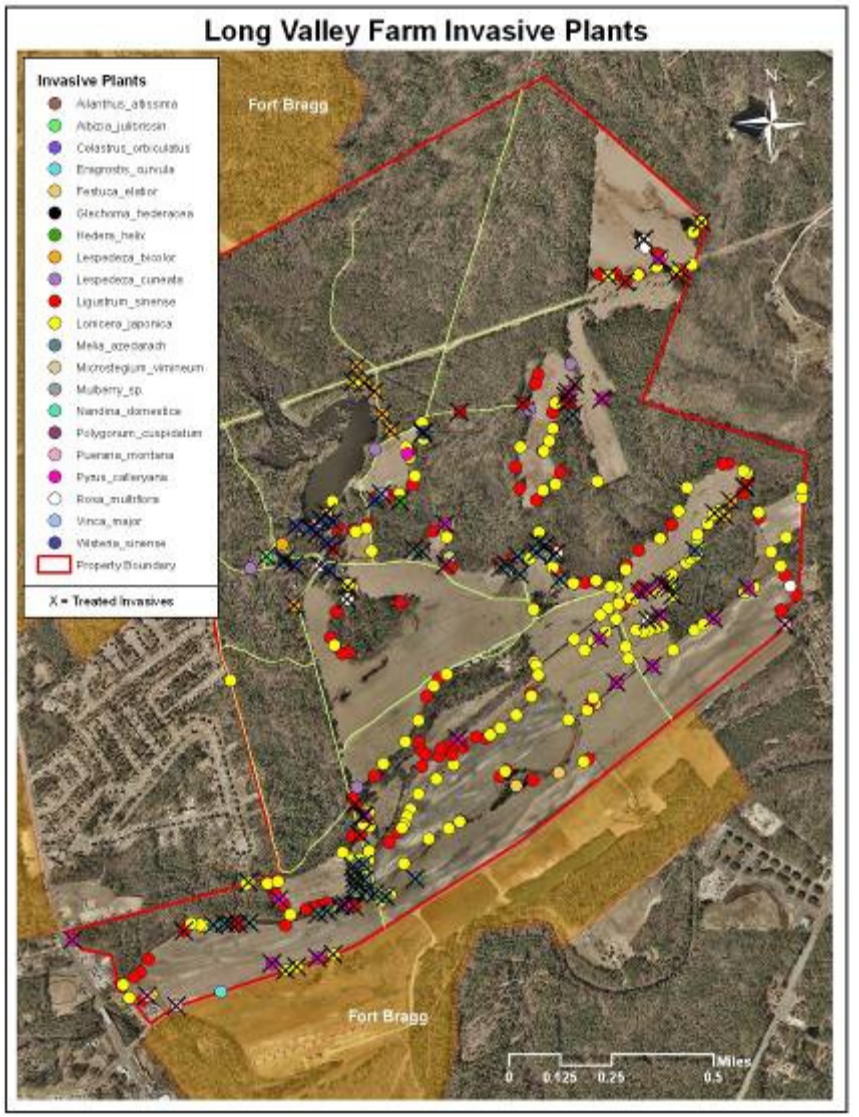


	A	B	C	D	E	F	G	H	I	J	K	L	M	N	O	P
1	pt_id	Species	Common_Name	Date	Property_Name	County	Ownership	NAD83	Est_size	Waypoint	Single_plant	Scattered_plants	Dense_monoculture	Scattered_dense	Invasion_Threat	Control_tec
643	642	Lonicera_japonica	Japanese_Honeysuckle	6/8/2009	Long_Valley_Farm	Cumberland	TNC	Y	small	loja140	0	1	0	0	Contain_Control	foliar_spray
644	643	Lonicera_japonica	Japanese_Honeysuckle	6/8/2009	Long_Valley_Farm	Cumberland	TNC	Y	medium	loja139	0	1	0	0	Contain_Control	foliar_spray
645	644	Ligustrum_sinense	Chinese_Privet	6/8/2009	Long_Valley_Farm	Cumberland	TNC	Y		lisi141	0	0	0	1		foliar_spray
646	645	Ligustrum_sinense	Chinese_Privet	6/8/2009	Long_Valley_Farm	Cumberland	TNC	Y	medium	lisi133	0	1	0	0	Contain_Control	foliar_spray
647	646	Ligustrum_sinense	Chinese_Privet	6/8/2009	Long_Valley_Farm	Cumberland	TNC	Y	medium	lisi134	0	1	0	0	Contain_Control	foliar_spray
648	647	Lonicera_japonica	Japanese_Honeysuckle	6/8/2009	Long_Valley_Farm	Cumberland	TNC	Y		loja154						
649	648	Pyrus_calleryana	Bradford_Pear	6/8/2009	Long_Valley_Farm	Cumberland	TNC	Y	small	Pear20	1	0	0	0	ED_RR	cut_spray
650	649	Lespedeza_cuneata	Chinese_Lespedeza	5/27/2009	Quewiffle	Hoke	TNC	Y	small	lecu1Q	0	0	1	0	Contain_Control	foliar_spray
651	650	Ligustrum_sinense	Chinese_Privet	5/27/2009	Quewiffle	Hoke	TNC	Y		lisi1Q	0	0	0	1	Contain_Control	foliar_spray
652	651	Lonicera_japonica	Japanese_Honeysuckle	5/27/2009	Quewiffle	Hoke	TNC	Y	small	loja1Q	0	0	1	0	Contain_Control	foliar_spray
653	652	Ligustrum_sinense	Chinese_Privet	5/27/2009	Quewiffle	Hoke	TNC	Y	small	lisi3Q	0	0	1	0	ED_RR	foliar_spray
654	653	Ligustrum_sinense	Chinese_Privet	5/27/2009	Quewiffle	Hoke	TNC	Y	small	lisi4Q	0	1	0	0	ED_RR	foliar_spray
655	654	Ligustrum_sinense	Chinese_Privet	5/27/2009	Quewiffle	Hoke	TNC	Y	small	lisi5Q	0	1	0	0	ED_RR	foliar_spray
656	655	Ligustrum_sinense	Chinese_Privet	5/27/2009	Quewiffle	Hoke	TNC	Y	small	lisi6Q	1	0	0	0	ED_RR	cut_spray
657	656	Lespedeza_cuneata	Chinese_Lespedeza	5/27/2009	Quewiffle	Hoke	TNC	Y	small	lecu02Q	0	0	1	0	Contain_Control	foliar_spray
658	657	Ligustrum_sinense	Chinese_Privet	5/27/2009	Quewiffle	Hoke	TNC	Y	small	lisi7Q	0	0	1	0	ED_RR	foliar_spray
659	658	Ligustrum_sinense	Chinese_Privet	5/27/2009	Quewiffle	Hoke	TNC	Y		lisi2Q						
660	659	Lespedeza_bicolor	Shrubby_Lespedeza	6/17/2009	Bowling_Crowley	Hoke	TNC	Y	small	lebi01	0	1	0	0	ED_RR	foliar_spray
661	660	Ligustrum_sinense	Chinese_Privet		Bowling_Crowley	Hoke	TNC	Y		lisix						
662	661	Melia_azedarach	Chinaberry	6/17/2009	Bowling_Crowley	Hoke	TNC	Y	medium	meaz03	0	1	0	0	ED_RR	hack_treat
663	662	Pyrus_calleryana	Bradford_Pear		Bowling_Crowley	Hoke	TNC	Y		pear						
664	663	Pueraria_montana	Kudzu	6/23/2009	Bowling_Crowley	Hoke	TNC	Y		pumo04					ED_RR	foliar_spray
665	664	Albizia_julibrissin	Mimosa	6/25/2009	Carvers_Creek	Cumberland	NC State Parks	Y	small	alju04cc	0	1	0	0	ED_RR	foliar_spray
666	665	Melia_azedarach	Chinaberry	6/25/2009	Unknown	Cumberland	Private	Y	small	meaz04cc	0	1	0	0	Monitor	cut_spray
667	666	Albizia_julibrissin	Mimosa	6/25/2009	Fort Bragg	Cumberland	USA	Y	small	alju03cc	0	1	0	0	ED_RR	cut_spray
668	667	Ligustrum_sinense	Chinese_Privet	6/25/2009	Fort Bragg	Cumberland	USA	Y	small	lisi01cc	0	1	0	0	ED_RR	foliar_spray
669	668	Lespedeza_bicolor	Shrubby_Lespedeza	6/25/2009	Fort Bragg	Cumberland	USA	Y	small	lebi08cc	1	0	0	0	ED_RR	foliar_spray
670	669	Lespedeza_bicolor	Shrubby_Lespedeza	6/25/2009	Fort Bragg	Cumberland	USA	Y	small	lebi07cc	0	1	0	0	ED_RR	foliar_spray
671	670	Rosa_multiflora	Multiflora_Rose	6/22/2009	Carvers_Creek	Cumberland	NC State Parks	Y	small	romu01cc	1	0	0	0	ED_RR	foliar_spray
672	671	Microstegium_vimineum	Japanese_Stiltgrass	6/22/2009	Carvers_Creek	Cumberland	NC State Parks	Y	small	mivi01cc	0	1	0	0	ED_RR	foliar_spray
673	672	Melia_azedarach	Chinaberry	6/22/2009	Carvers_Creek	Cumberland	NC State Parks	Y	small	meaz01cc	1	0	0	0	ED_RR	cut_spray
674	673	Murdannia_keisak	Marsh_Dewflower	6/22/2009	Carvers_Creek	Cumberland	NC State Parks	Y	small	muke01cc	0	0	1	0	Contain_Control	
675	674	Lespedeza_bicolor	Shrubby_Lespedeza	6/22/2009	Carvers_Creek	Cumberland	NC State Parks	Y	medium	lebi04cc	0	1	0	0	ED_RR	foliar_spray
676	675	Lespedeza_bicolor	Shrubby_Lespedeza	6/22/2009	Carvers_Creek	Cumberland	NC State Parks	Y	small	lebi03cc	0	1	0	0	ED_RR	foliar_spray
677	676	Lespedeza_bicolor	Shrubby_Lespedeza	6/22/2009	Carvers_Creek	Cumberland	NC State Parks	Y	small	lebi02cc	1	0	0	0	ED_RR	foliar_spray
678	677	Lespedeza_cuneata	Chinese_Lespedeza	6/22/2009	Carvers_Creek	Cumberland	NC State Parks	Y	medium	lecu02cc	0	1	0	0	Contain_Control	foliar_spray
679	678	Lespedeza_cuneata	Chinese_Lespedeza	6/22/2009	Carvers_Creek	Cumberland	NC State Parks	Y	large	lecu01cc	0	0	0	1	Contain_Control	foliar_spray
680	679	Lespedeza_bicolor	Shrubby_Lespedeza	6/22/2009	Carvers_Creek	Cumberland	NC State Parks	Y	medium	lebi01cc	0	1	0	0	ED_RR	foliar_spray
681	680	Albizia_julibrissin	Mimosa	6/22/2009	Carvers_Creek	Cumberland	NC State Parks	Y	small	alju02cc	0	1	0	0	ED_RR	cut_spray
682	681	Albizia_julibrissin	Mimosa	6/22/2009	Carvers_Creek	Cumberland	NC State Parks	Y	medium	alju01cc	0	1	0	0	ED_RR	hack_treat
683	682	Eragrostis_curvula	Weeping_Lovegrass	6/25/2009	Fort Bragg	Cumberland	USA	Y	small	ercu01cc	0	1	0	0	ED_RR	foliar_spray
684	683	Lespedeza_cuneata	Chinese_Lespedeza	6/25/2009	ClarkII	Cumberland	Private	Y	huge	lecu06cc	0	0	0	1	Contain_Control	foliar_spray
685	684	Lespedeza_cuneata	Chinese_Lespedeza	6/25/2009	ClarkII	Cumberland	Private	Y	huge	lecu04cc	0	1	0	0	Contain_Control	foliar_spray
686	685	Lespedeza_cuneata	Chinese_Lespedeza	6/25/2009	ClarkII	Cumberland	Private	Y	huge	lecu05cc	0	1	0	0	Contain_Control	foliar_spray
687	686	Lagerstroemia_indica	Crape_Myrtle	6/25/2009	ClarkII	Cumberland	Private	Y	small	eual01cc	0	1	0	0	ED_RR	foliar_spray
688	687	Lespedeza_bicolor	Shrubby_Lespedeza	6/25/2009	ClarkII	Cumberland	Private	Y	huge	lebi06cc	0	1	0	0	ED_RR	foliar_spray
689	688	Lespedeza_cuneata	Chinese_Lespedeza	6/25/2009	ClarkII	Cumberland	Private	Y	large	lecu03cc	0	0	0	1	Contain_Control	foliar_spray
690	689	Lespedeza_bicolor	Shrubby_Lespedeza	6/25/2009	ClarkII	Cumberland	Private	Y	huge	lebi05cc	0	1	0	0	Contain_Control	foliar_spray
691	690	Lespedeza_bicolor	Shrubby_Lespedeza	6/25/2009	Unknown	Cumberland	Private	Y	medium	lecu08cc	0	1	0	0	Monitor	foliar_spray
692	691	Eragrostis_curvula	Weeping_Lovegrass	6/25/2009	Carvers_Creek	Cumberland	NC State Parks	Y	small	ercu03cc	0	1	0	0	ED_RR	foliar_spray
693	692	Eragrostis_curvula	Weeping_Lovegrass	6/25/2009	Carvers_Creek	Cumberland	NC State Parks	Y	medium	ercu02cc	0	1	0	0	Contain_Control	foliar_spray
694	693	Lespedeza_cuneata	Chinese_Lespedeza	6/25/2009	Unknown	Cumberland	Private	Y	medium	lecu07cc	0	1	0	0	Contain_Control	foliar_spray
695	694	Lespedeza_bicolor	Shrubby_Lespedeza	6/25/2009	ClarkII	Cumberland	Private	Y	small	lebi09cc	0	1	0	0	ED_RR	foliar_spray
696	695	Pueraria_montana	Kudzu	7/6/2009	Haskell	Scotland	Private	Y	large	pumo03	0	1	0	0	ED_RR	foliar_spray
697	696	Rosa_multiflora	Multiflora_Rose	7/6/2009	Haskell	Scotland	Private	Y	medium	romu03	0	1	0	0	ED_RR	foliar_spray
698	697	Pueraria_montana	Kudzu	7/6/2009	Haskell	Scotland	Private	Y	small	pumo02	1	0	0	0	ED_RR	foliar_spray

GIS Data


Troutman_EDRR.mxd - ArcMap - ArcView
File Edit View Bookmarks Insert Selection Tools Window Help
Layers
Treated Invasives
Invasive Species
Common Name
Autumn_Olive
Chinsberry
Chinese_Lespedeza
Chinese_Privet
Chinese_Wisteria
Ground_Ivy
Heavenly_Bamboo
Japanese_Honeysuckle
Japanese_Knotweed
Japanese_Stiltgrass
Johnsongrass
Kudzu
Marsh_Dewflower
Mimosa
Multiflora_Rose
Shrubby_Lespedeza
Sicklepod
Tall_Fescue
Tree-of-Heaven
Weeping_Lovegrass
Burn Unit
troutman_stands
Troutmen
Troutman Farm
Hoke_Troutman_5 07
Municipal Areas
County Lines
Railroad
Identify
Identify from:
Invasive Species
WAYPOINT
Troutman Farms - Treated Invasives
Invasive Species
Common Name
Hwy 15-501
start


Parsons Tract Invasive Plants
N
PAPPY RABB ROAD
DERBY ROAD
Invasive Plants
Species
Ailanthus_altissima
Albizia_julibrissin
Eragrostis_curvula
Lespedeza_cuneata
Ligustrum_sinense
Lonicera_japonica
Melia_azedarach
Rosa_multiflora
Sorghum_halepense
Wisteria_sinense
Safe Harbor Property
Parsons Tract
X = Treated Invasives
0
0.125
0.25
0.5
Miles


Long Valley Farm Invasive Plants
Invasive Plants
Ailanthus_altissima
Albizia_julibrissin
Celastrus_orbiculatus
Eragrostis_curvula
Festuca_elatior
Glechoma_hederacea
Hedera_helix
Lespedeza_bicolor
Lespedeza_cuneata
Ligustrum_sinense
Lonicera_japonica
Melia_azedarach
Microstegium_vimineum
Mulberry_sp.
Nandina_domestica
Polygonum_cuspidatum
Pueraria_montana
Pyrus_calleryana
Rosa_multiflora
Vinca_major
Wisteria_sinense
Property Boundary
X = Treated Invasives
Fort Bragg
Fort Bragg
N
0
0.125
0.25
0.5
Miles

Future Activities

- Talk to local nurseries about invasives and native alternatives.
- Engage county and local governments in invasive plant management.
- Continue surveys of conservation lands (we've only surveyed 20,945 acres out of 143,000+ acres).
- Once survey and initial treatment of conservation lands are complete, we plan to survey adjacent lands in order to establish "weed free" buffers zones.

Thank You!

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