West Branch Silvicultural Treatment Results 1999-2011

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Introduction

- Silvicultural treatment associated with dam rehabilitation projects began in 1996-97
- Plots established and measured prior to treatment in 1999
- Treatment at West Branch began in fall 1999
- Plots re-measured in

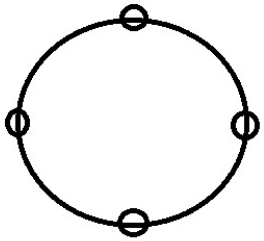
  2001,2005 and 2011

Silvicultural Treatment Goals

- Focus on conifer plantations and nearby natural forests
- Removal of hazardous trees
- Thinning of stands to remove mature trees and encourage new regeneration
- Improved growing conditions for remaining trees
- Management of invasive plants
  - Cutting and removal
  - Cut stem herbicide treatment

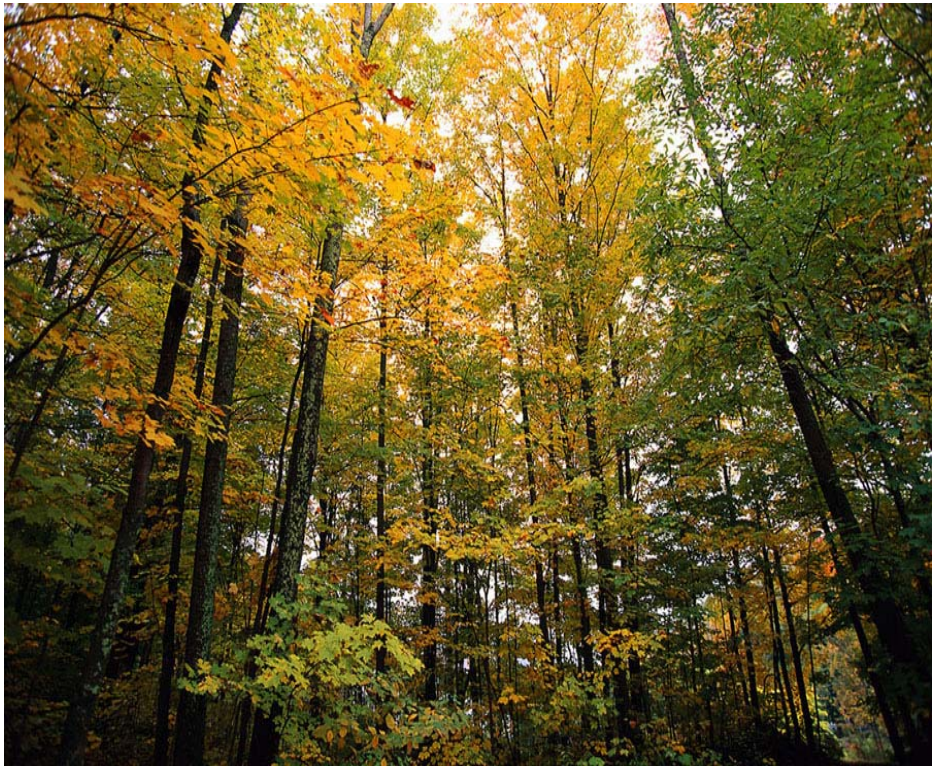
West Branch Plot Measurements

Plots were set up prior to thinning using 0.1 acre circular plots for overstory and saplings and 4-1m^2 to capture ground cover at the cardinal points around the periphery of the plot.



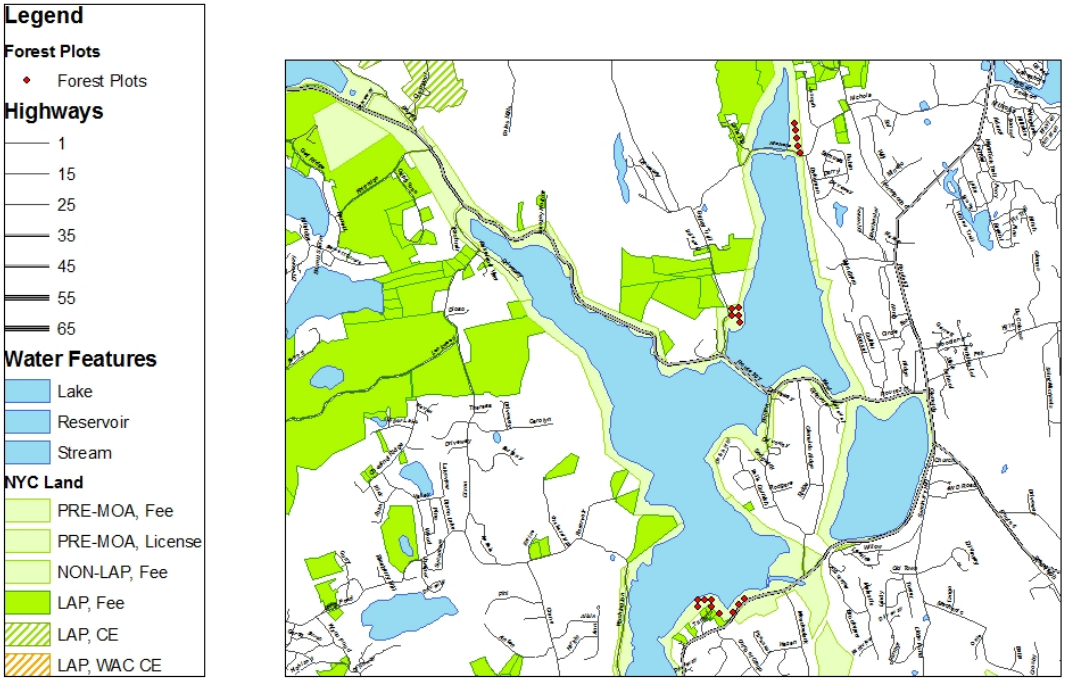
Plot measurements included:

- Overstory tree species, diameters and heights
- Understory sapling and shrub species and diameter classes
- Ground cover and seedling species and percent cover and number of seedlings



Plot Locations

West Branch Silviculture Plots



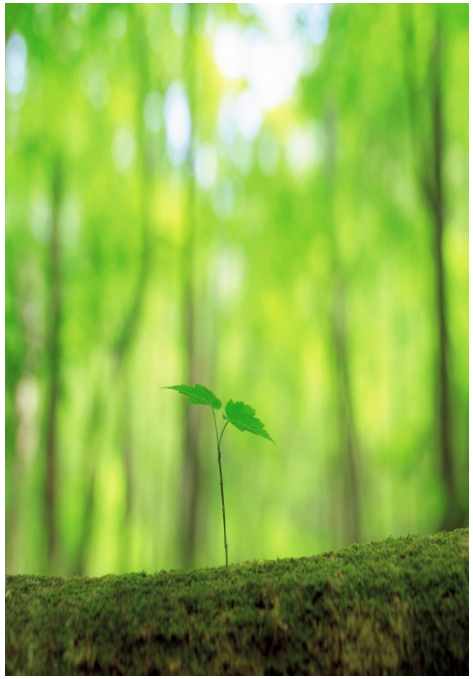
Eighteen plots were established and measured:

- 5 Plots at Gypsy Trail
- 5 Plots at Nichols Rd
- 8 Plots at Route 6

Overview of Treatment Results

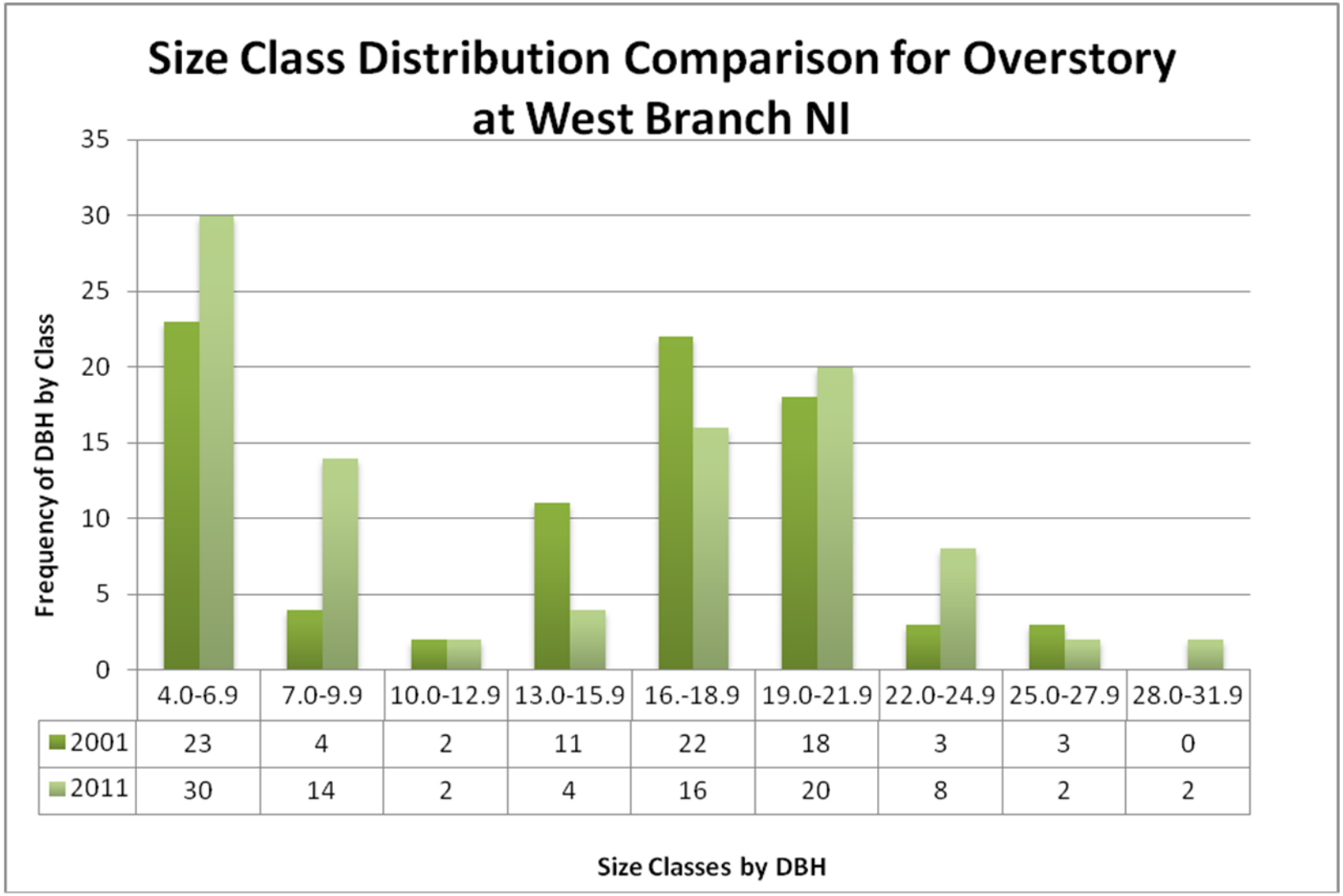
- Overall reduction in Basal Area for treated areas at West Branch
- Continued changes in diameter breast height (DBH) and trees per acre (TPA) due to opportunity for growth and maturation of seedlings, saplings and overstory trees
- Increased canopy gaps in the short term that have mostly closed in the intervening 10 years
- Reduced conifer overstory that was inhibiting hardwood regeneration
- Improved overstory size class frequency distribution from 2001-2011

Benefits of Forest Thinning



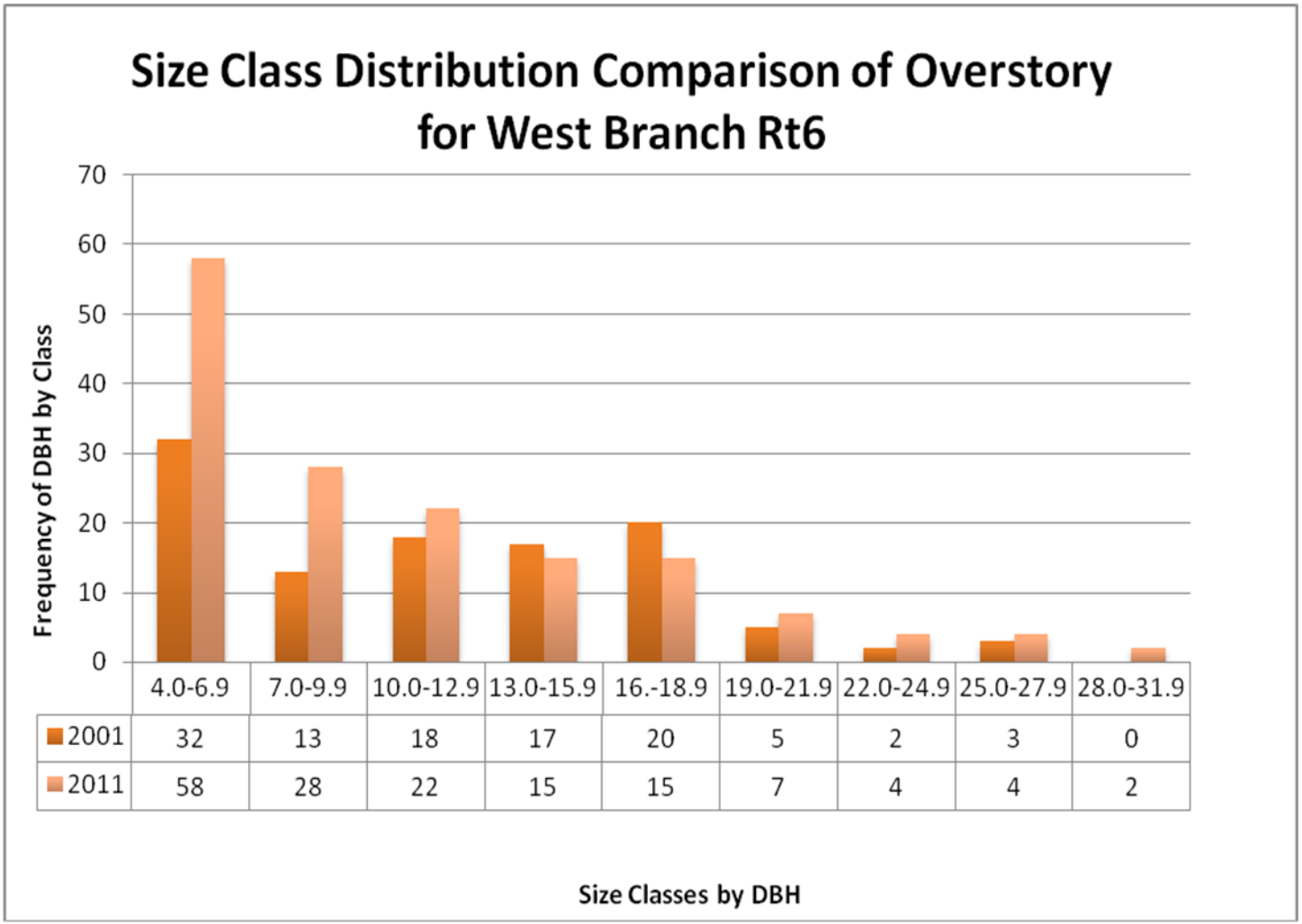
- Canopy gaps
  - Reduced dominance competition of overstory
  - Increased sunlight for understory
  - Improved growth of hardwood seedlings
  - Increased natural regeneration
- Removal of Conifers
  - End soil acidification caused by species
  - End allelopathic effects caused by phenolic content found in leaf litter under mature conifers
- Reduced exotic species invasion

Overstory Comparison Nichols Road



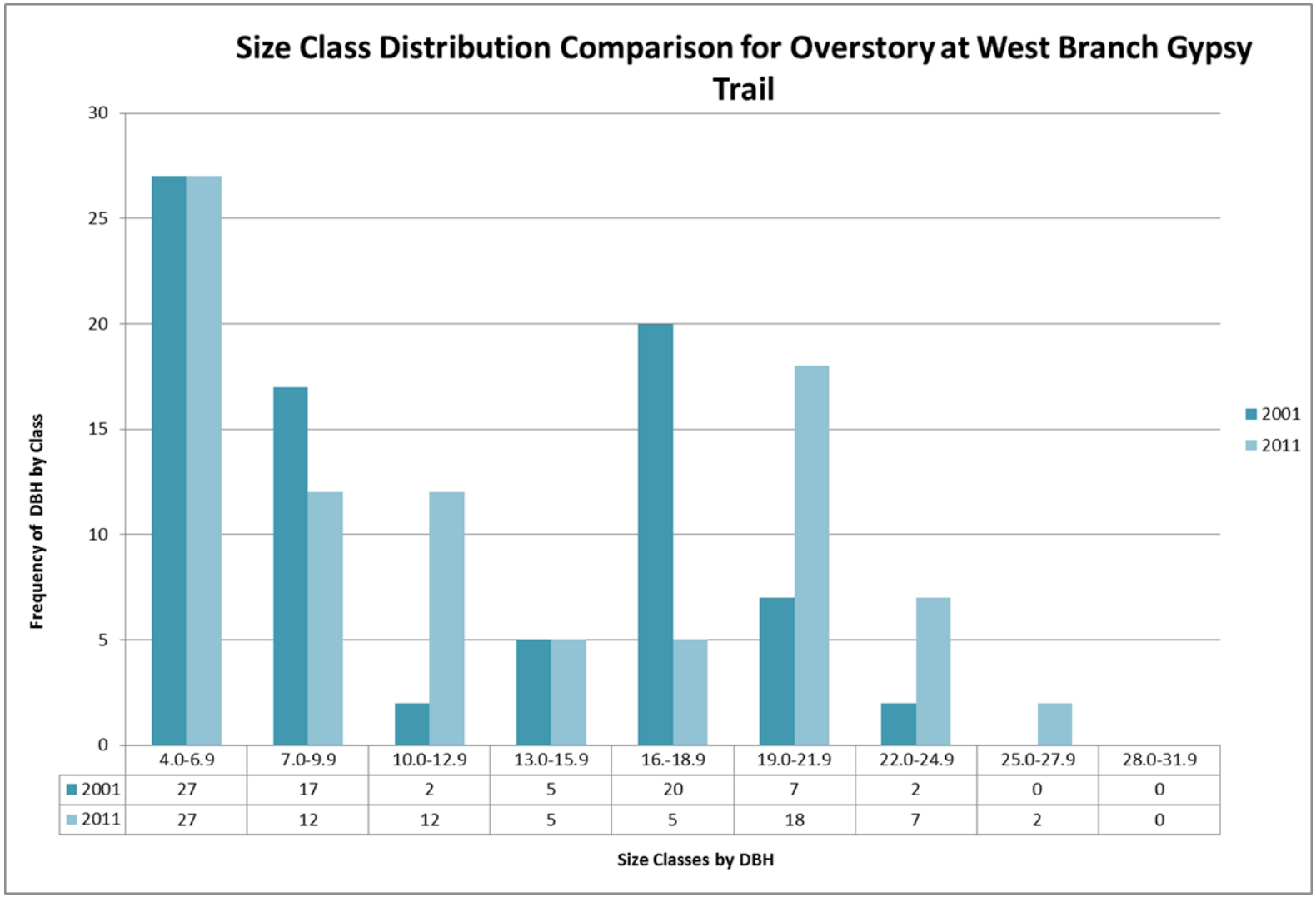
	4.0-6.9	7.0-9.9	10.0-12.9	13.0-15.9	16.-18.9	19.0-21.9	22.0-24.9	25.0-27.9	28.0-31.9
2001	23	4	2	11	22	18	3	3	0
2011	30	14	2	4	16	20	8	2	2

Overstory Comparison Route 6



	4.0-6.9	7.0-9.9	10.0-12.9	13.0-15.9	16.-18.9	19.0-21.9	22.0-24.9	25.0-27.9	28.0-31.9
2001	32	13	18	17	20	5	2	3	0
2011	58	28	22	15	15	7	4	4	2

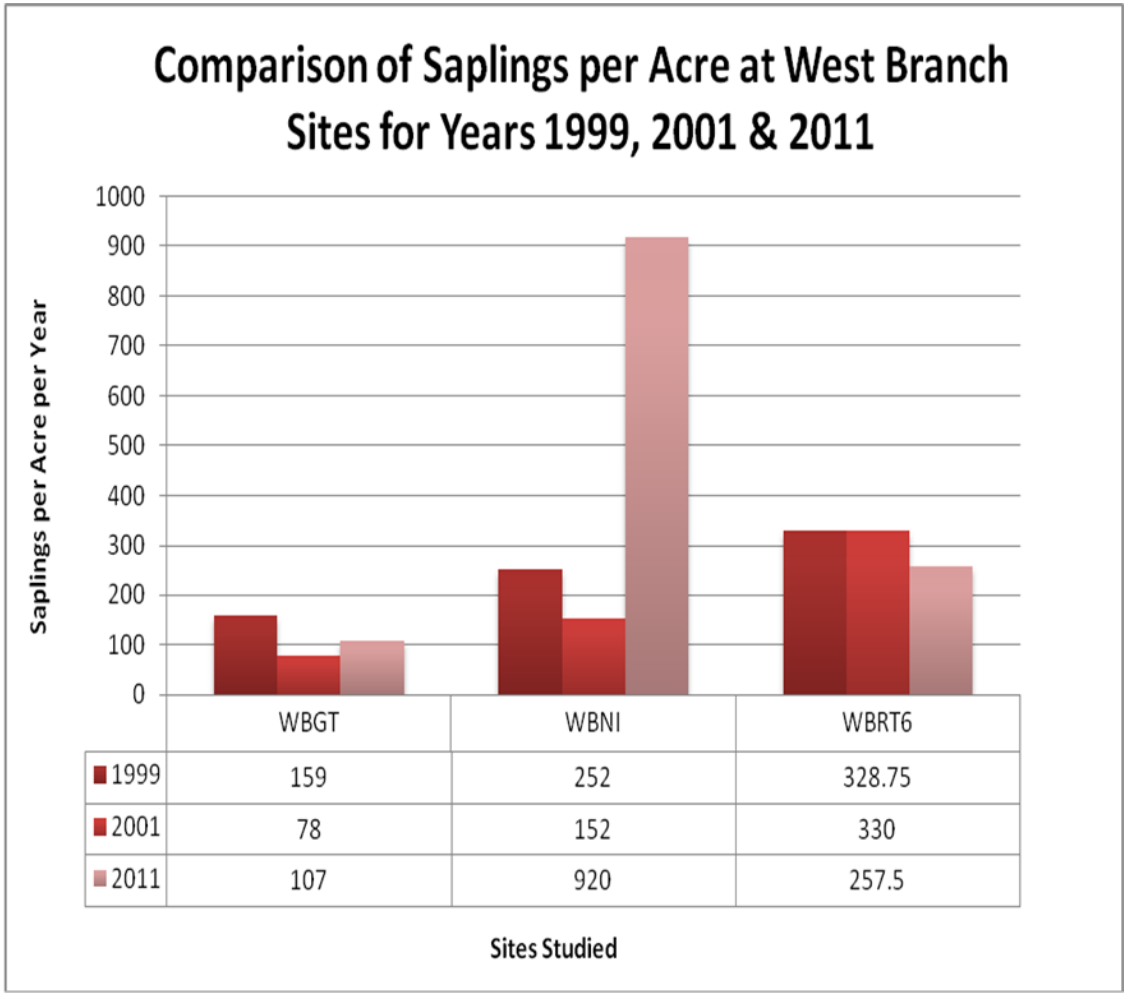
Overstory Comparison Gypsy Trail



	4.0-6.9	7.0-9.9	10.0-12.9	13.0-15.9	16.-18.9	19.0-21.9	22.0-24.9	25.0-27.9	28.0-31.9
2001	27	17	2	5	20	7	2	0	0
2011	27	12	12	5	5	18	7	2	0

Understory Comparison All Sites

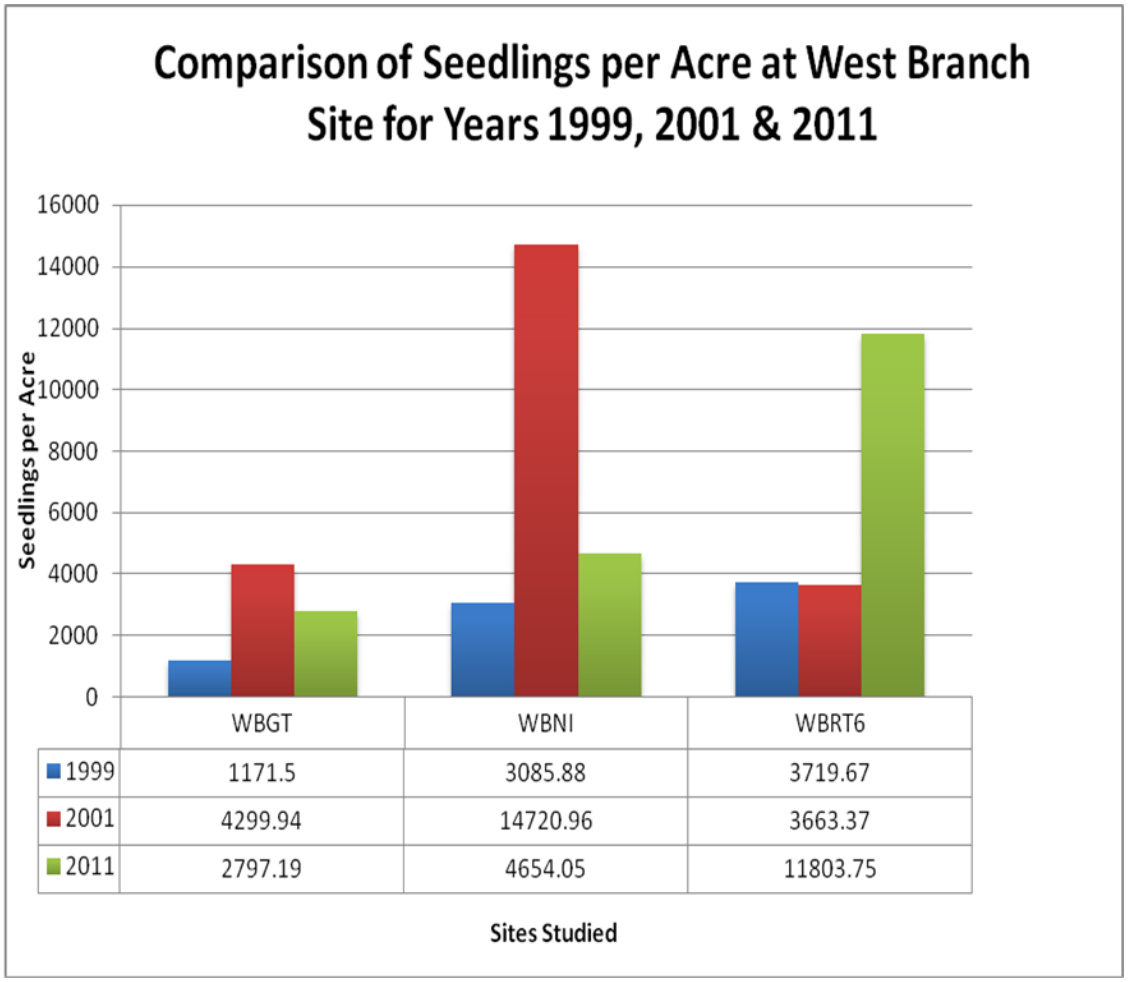
- ❖ Positive treatment results indicated at all sites
- ❖ Initial decrease in saplings following thinning generally followed by increase over next 10 years
- ❖ Reduction in sapling count at Rt. 6 site indicates growth into overstory size class
- ❖ Large increase in saplings at Nichols Road from rapid seedling growth



	WBGT	WBNI	WBRT6
1999	159	252	328.75
2001	78	152	330
2011	107	920	257.5

Seedling Comparison All Sites

- ❖ Regeneration increases indicated at all three sites following treatment
- ❖ Clear population increase at WBGT and WBNI sites
- ❖ Difference in species type at each site may have influenced regeneration rate
- ❖Seed dispersal processes influence variation in rate of regeneration at sites



	WBGT	WBNI	WBRT6
1999	1171.5	3085.88	3719.67
2001	4299.94	14720.96	3663.37
2011	2797.19	4654.05	11803.75

Reproductive Cycles of Trees

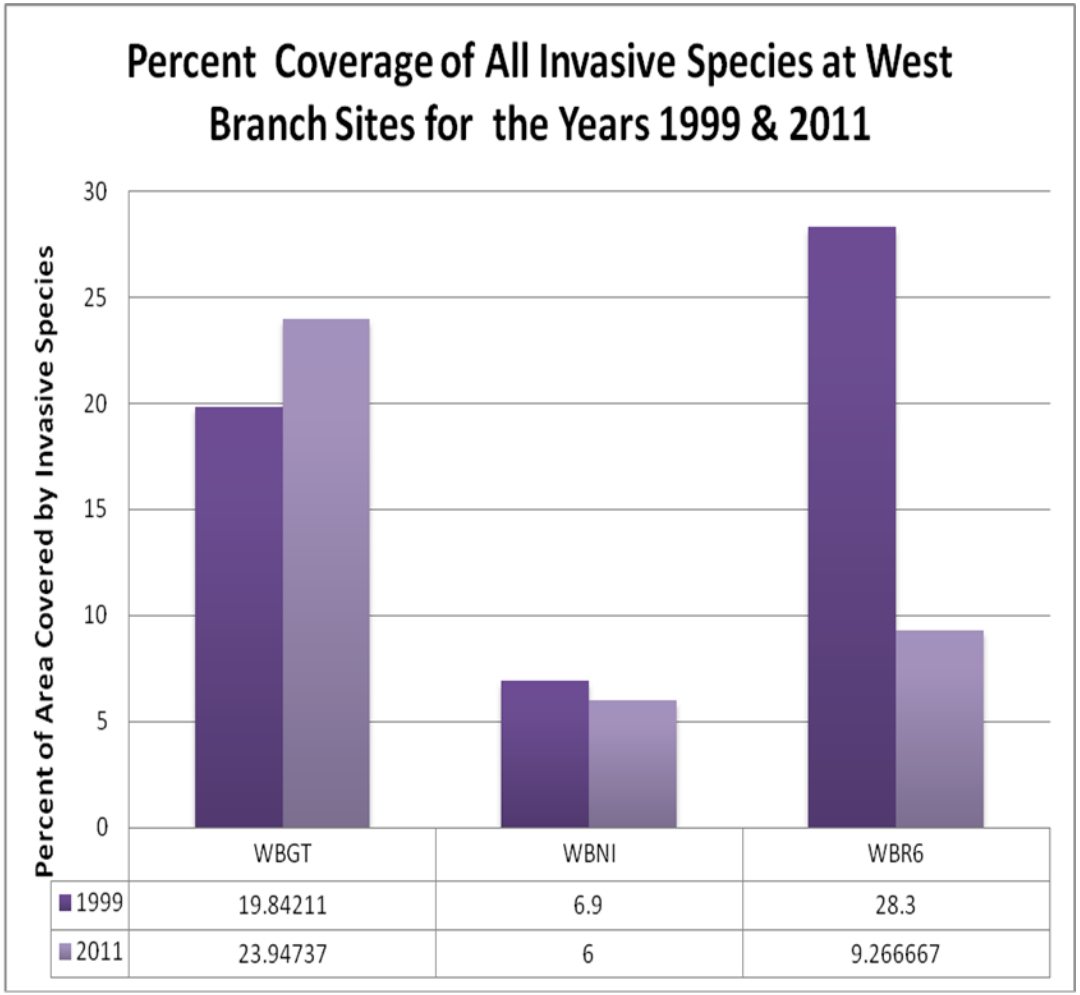
Reproductive Cycles of Tree Species at West Branch			
	Approx Seed Bearing Age(YRS)	Method of Dispersal	Strong Production
Maple	40	wind - samaras	increase with age
Birch	40	wind- samaras	every 1-2 yrs
White Pine	20-30	wildlife-cones	every 3-5 yrs

The regeneration rate of each species depends upon its seed production cycle, germination rate, and dispersal method.

- Cones generally fall nearby the tree but may be carried off-site by rodents or gravity
- Samaras, with their attached wings, may be blown long distances

Invasive Species Percent Coverage

- ❖Native, hay scented fern included in analysis due to its invasive tendencies
- ❖Excellent control at WBR6 aided by growth of saplings into overstory and seedling recruitment
- ❖Increase in hay scented fern at WBGT after treatment may have affected seedling growth
- ❖Future projects may require a plan for reduction of invasive or interfering species prior to thinning



Conclusions

- A gradual improvement in overall forest growth and regeneration was observed after treatment occurred
- Removal of a portion of the overstory is important, especially in conifer plantations, as it improves opportunity for growth of all size classes and removes agent of changes in soil chemistry.
- A reduction of invasive species is imperative in the plan to improve watershed health
- Results show the treatment strategy was effective at West Branch

Recommendations

- The silvicultural treatment strategy used at East of Hudson dam rehabilitation sites should be used as a prototype treatment for other locations with similar issues of overstory stagnation and lack of regeneration
- Exotic conifers should be removed and prevented from regenerating
- When choosing individual trees to remove from the overstory, the reproductive cycles of the preferred species should be taken into consideration when regeneration is a goal
- Herbaceous invasive plants should be surveyed and considered prior to removal of the overstory, as additional planning may be required to prevent invasive over-growth when the canopy is opened

Citations

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