

Sapling response to beaver predation in a created forested wetland in Loudoun County, VA

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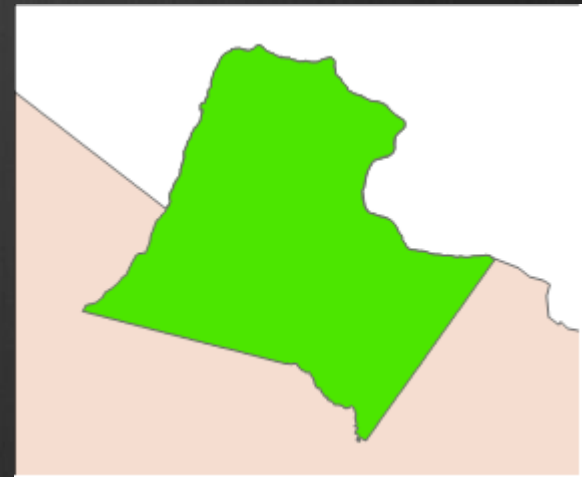
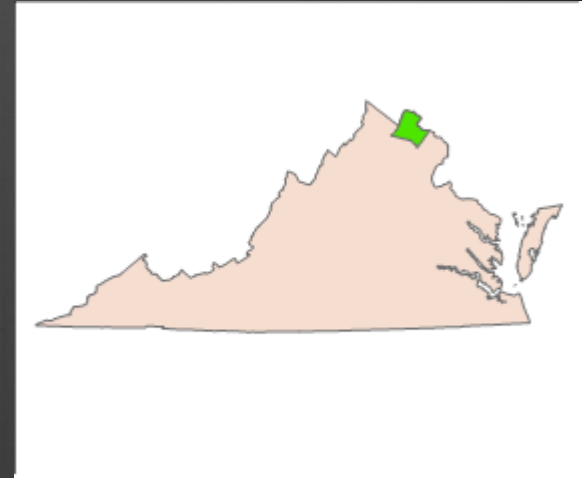
Background

- Beavers are a keystone species (McKinstry, et. al, 2001)
 - By removing beavers there is potential reduction of wetlands (McKinstry, et. al, 2001)
- Modification of wetlands by beavers
- Mitigation
 - Clean Water Act of 1972



Site Description

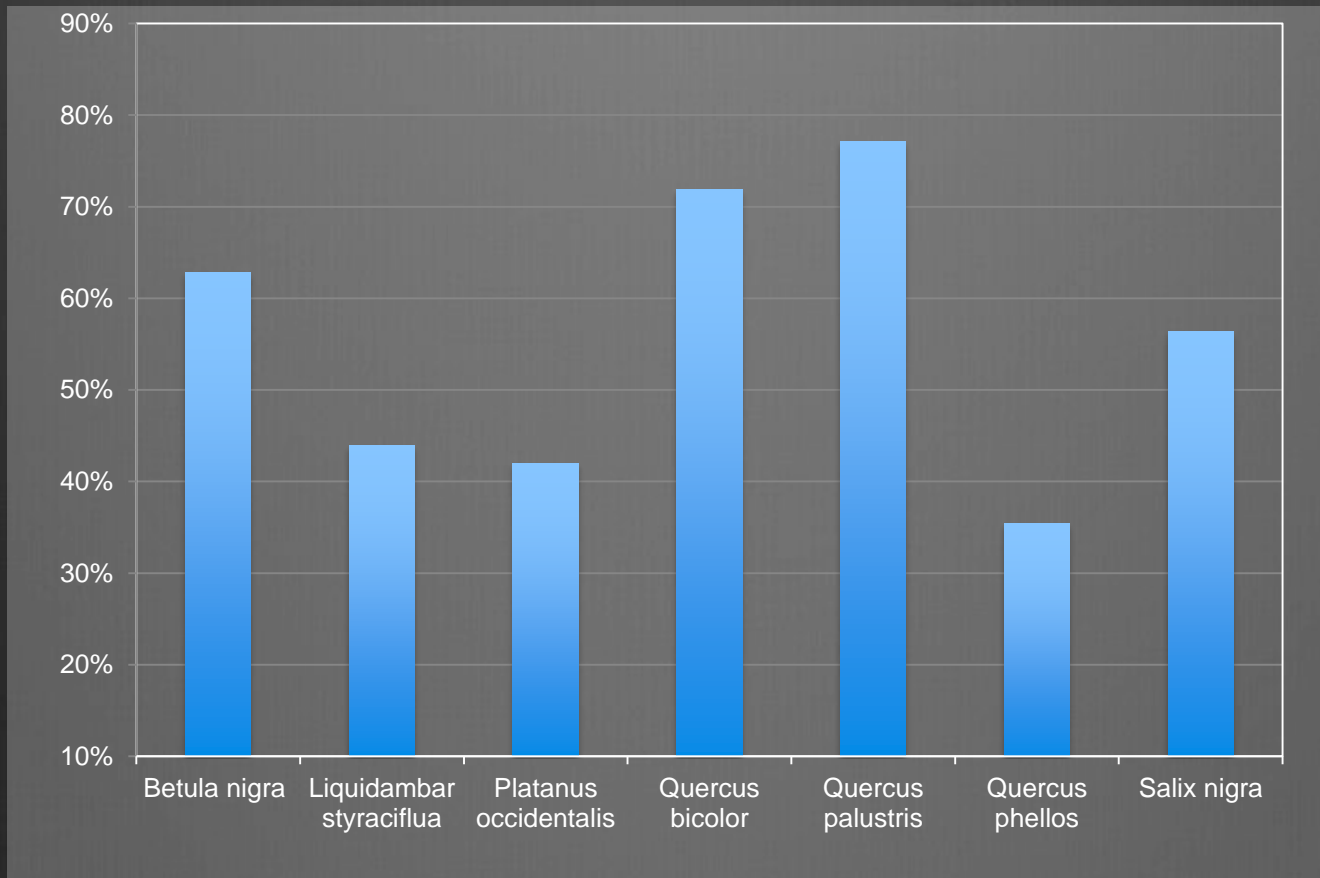
- Slow growth of woody species
- Study started in 2009 with the planting of species
- Three phases of study



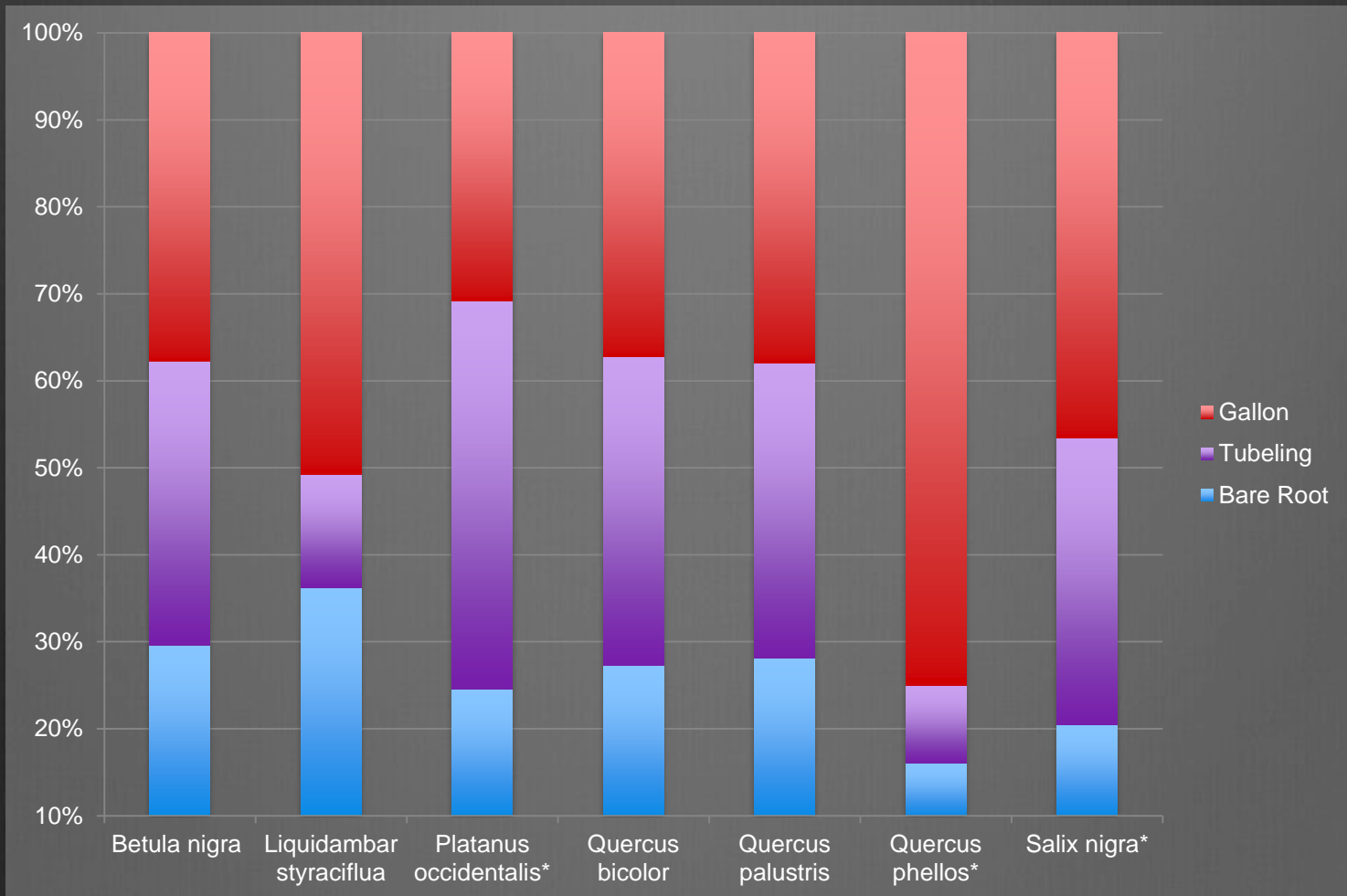
Methods

- Seven species were planted
- Three present stock types
- Parameters measured include ground diameter, canopy, height, a missing or dead tree, etc.
- Beaver herbivory consisted of girdling and stem removal

Original Trees Alive in 2014



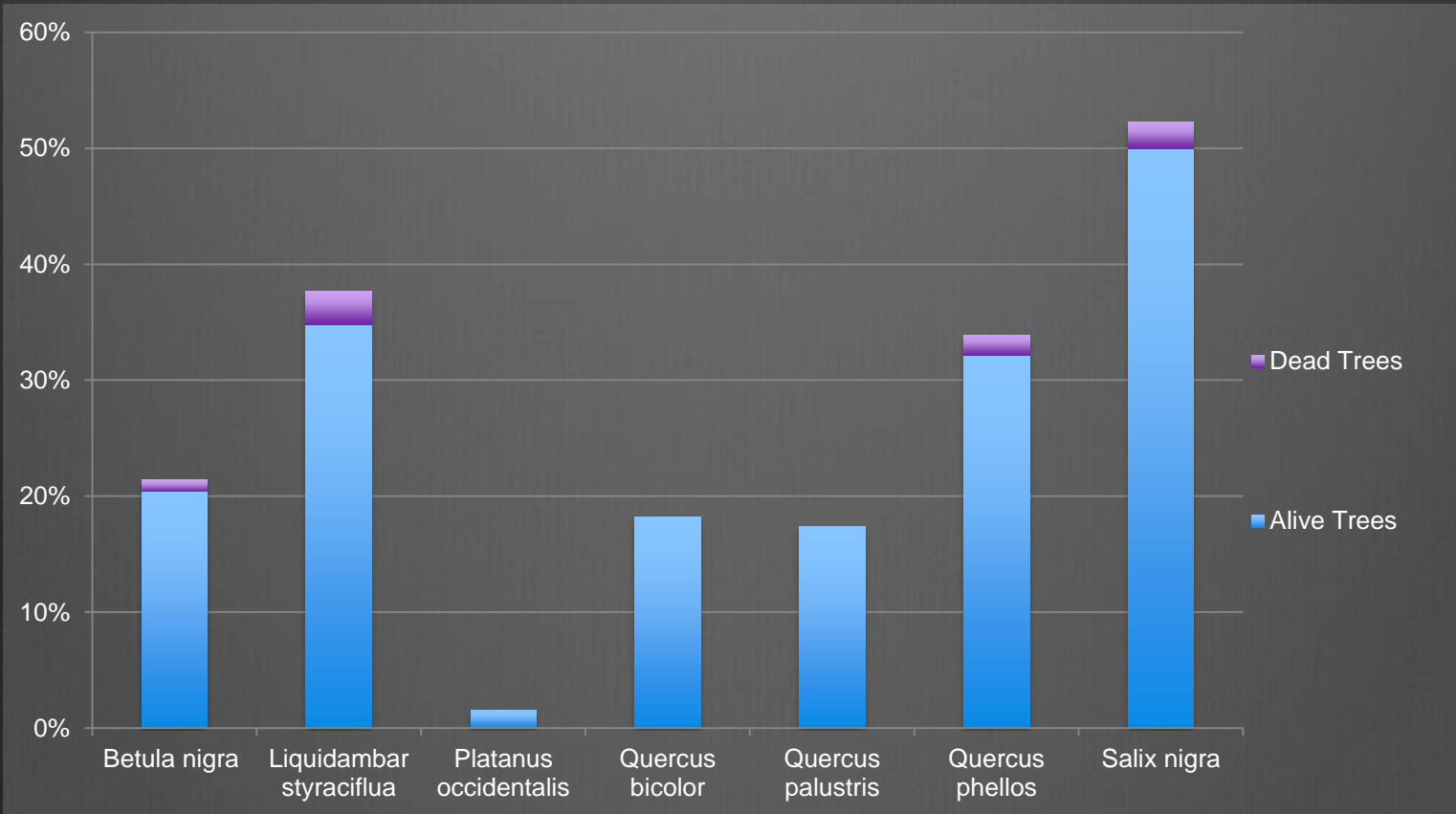
Stock Type Proportions of Surviving Trees



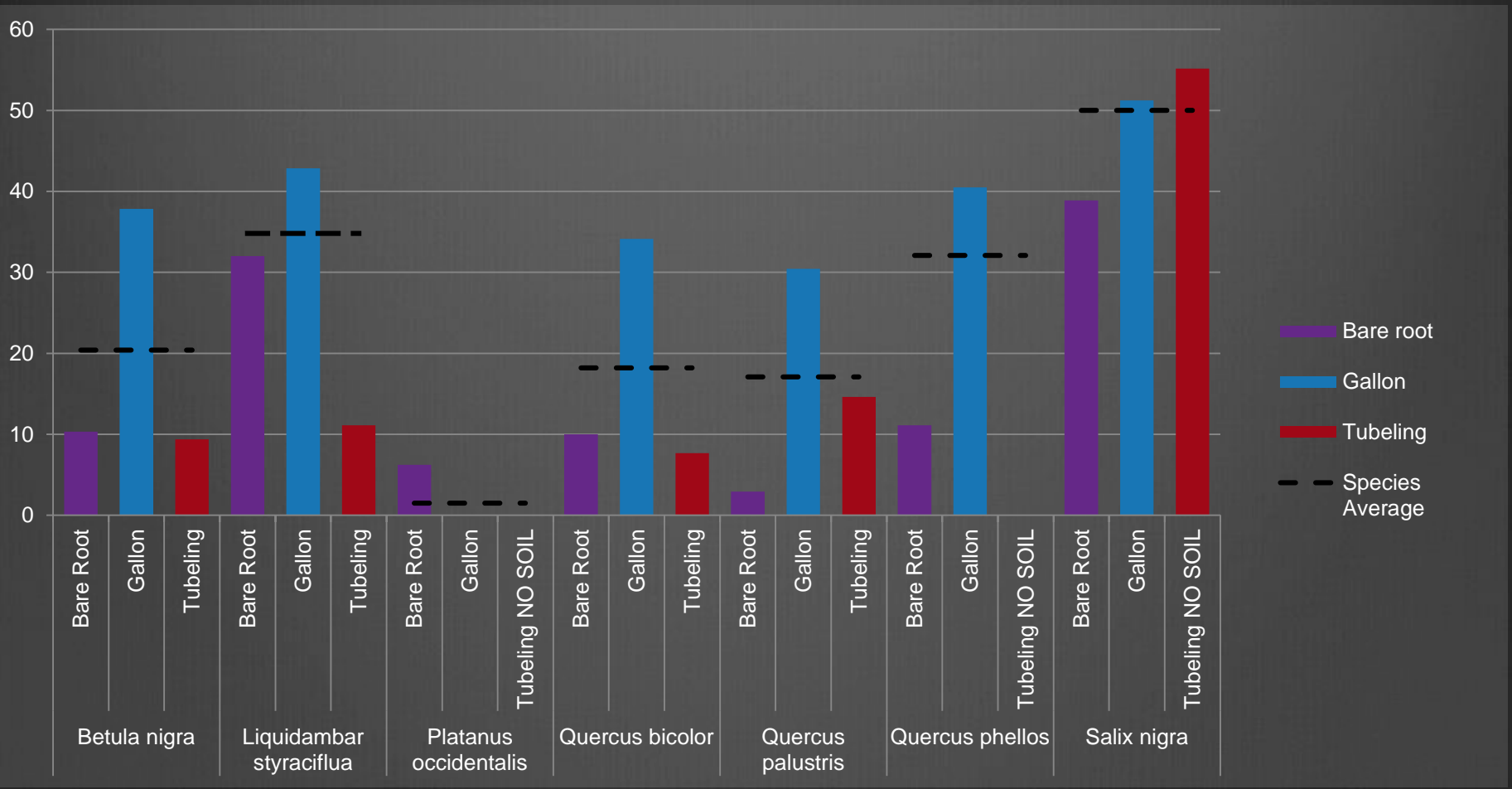
* Indicates those Tubelings with No Soil



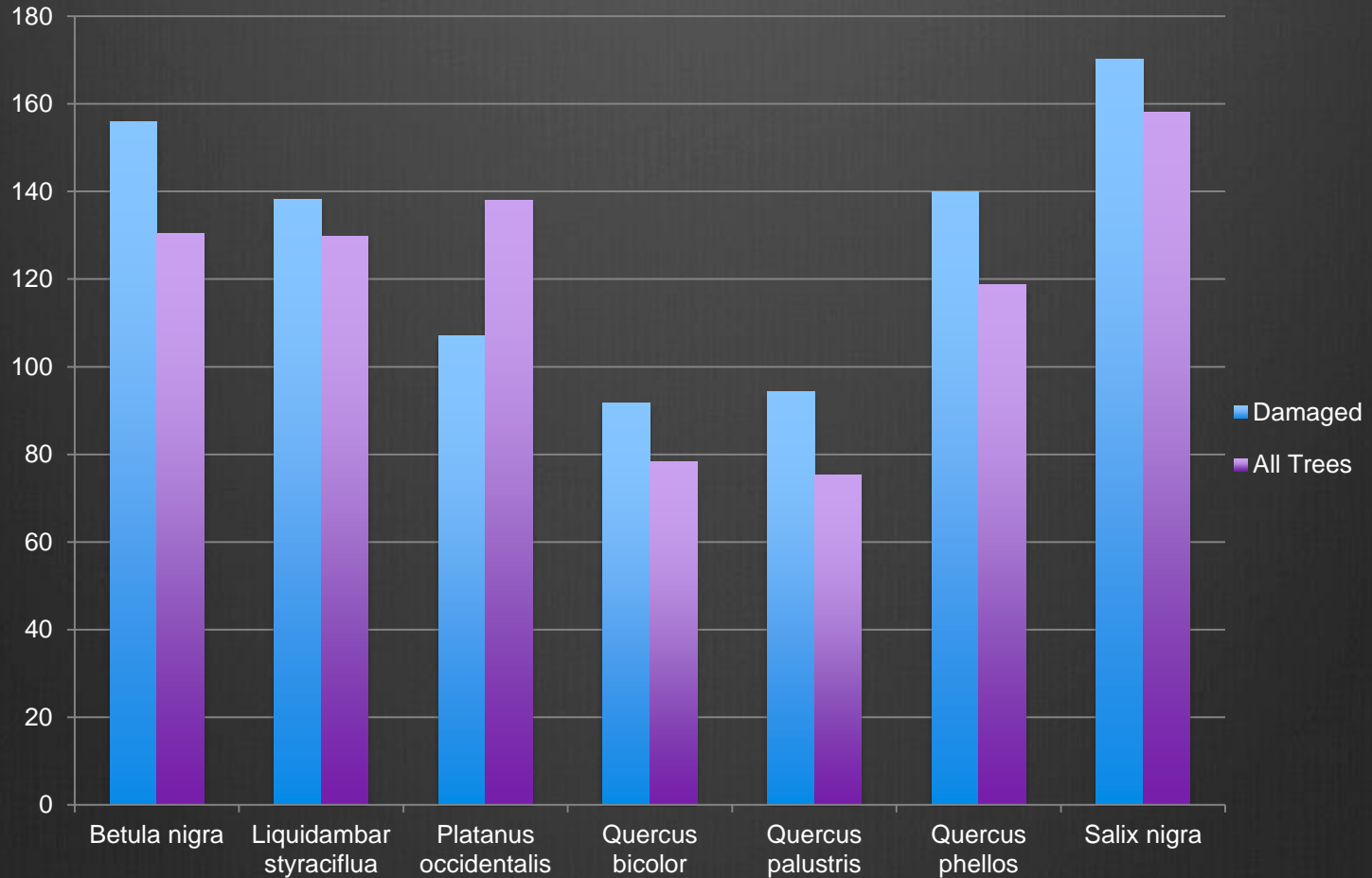
Frequency of Herbivory



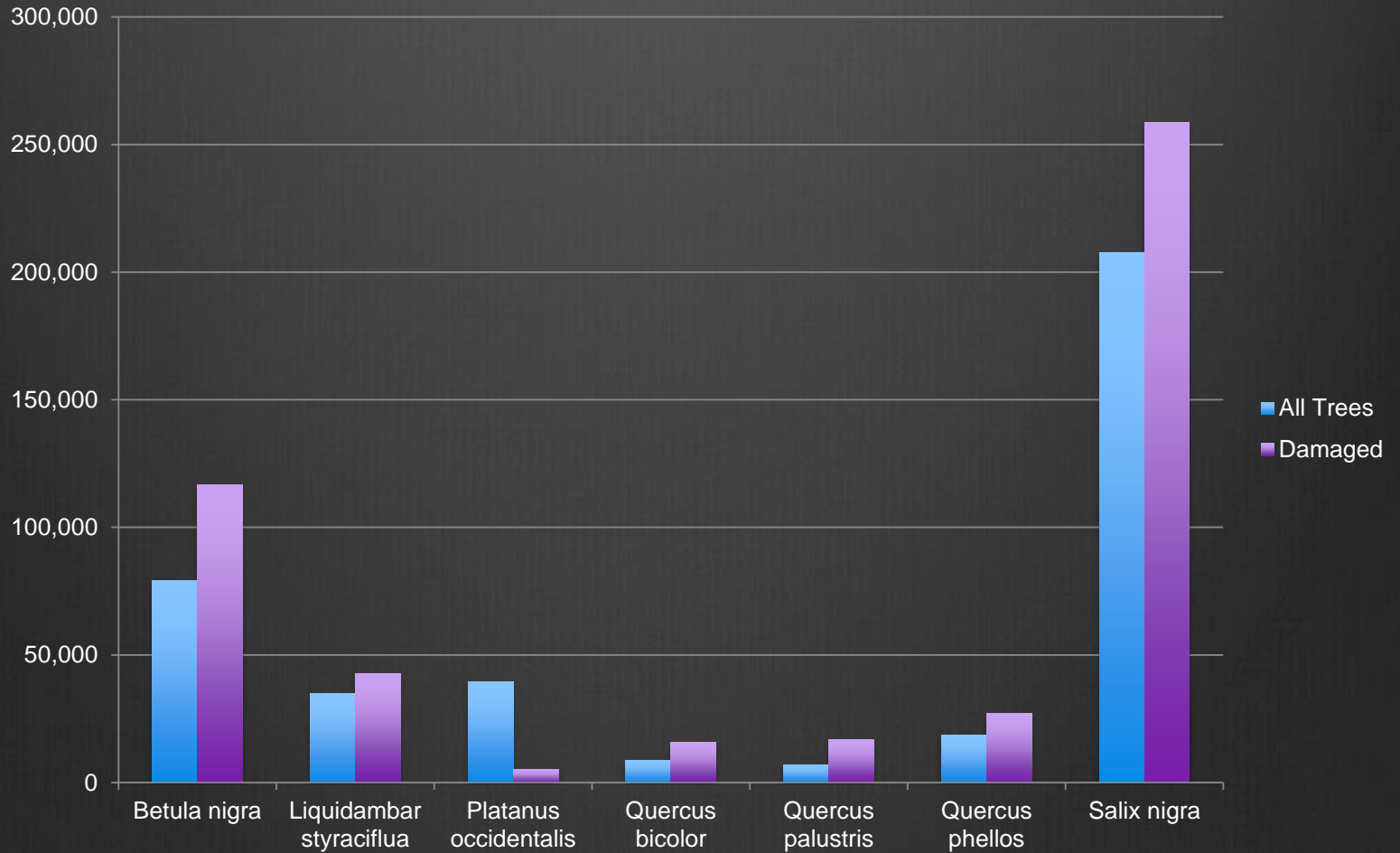
Frequency of Herbivory by Stock Type



Average Height



Average Stem Volume



Discussion

- Species-selectivity is present in beavers (Raffel, et. al, 2009)
- Abundance Preference does not seem to be present (Raffel, et. al, 2009)

TABLE 3. Comparison of the observed number of saplings cut per species and the expected number cut (under a non-selective null hypothesis) at progressive stages of resource depletion.

Sapling density		Species			d_{max}^*	P
		Aspen	Alder	Maple		
60	observed	57	20	6	30	<.05
60	predicted	27	28	28		
50	observed	31	13	3	20	<.05
50	predicted	11	17	19		
40	observed	23	25	11	17	<.05
40	predicted	8	23	28		
30	observed	7	35	12	19	<.05
30	predicted	3	20	31		
20	observed	1	17	17	8	<.05
20	predicted	1	9	25		
10	observed	0	3	13	0	NS
10	predicted	0	3	13		

* Differences between observed and expected values were tested using a Kolmogorov-Smirnov test for discrete categories.

Work Cited

- Row, John M. and W. A. Geyer. 2010. Black Willow. United States Department of Agriculture.
- Fryxell, J. M. and C. M. Doucet. 1993. Diet Choice and the Functional Response of Beavers. *Ecology* 74: 1297- 1306.
- Matthews, Jeffery W. and A. G. Endress. 2008. Performance Criteria, Compliance Success, and Vegetation Development in Compensatory Mitigation Wetlands. *Environmental Management* 41: 130-141.
- McKinstry, Mark C., P. Caffrey, and S. H. Anderson. 2001. The Importance of Beaver to Wetland Habitats and Waterfowl in Wyoming. *Journal of the American Water Resources Association* 37: 1571- 1577.
- Raffel, T. R., N. Smith, C. Cortright, and A. J. Gatz. 2009. Central place foraging by beavers (*Castor canadensis*) in a complex lake habitat. *American Midland Naturalist* 162: 62-73.
- Syphard, Alexandra D. and M. W. Garcia. 2001. Human- and beaver-induced wetland changes in the Chickahominy River watershed from 1953-1994. *Wetlands* 21: 342-353.
- Tiner, Ralph W. *Wetland Indicators: A Guide to Wetland Identification, Delineation, Classification, and Mapping*. Boca Raton, FL: CRC Press LLC, 1999. Print.

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Betula nigra



Liquidambar styraciflua