

Competitive Research Grant Program

An evaluation of the impact of long term flooding regimes on natural hardwood stands

Investigator(s): Andrew W. Ezell, Andrew Londo, Richard Maiers, Forestry; Richard Kaminski, Wildlife and Fisheries

Project Objectives:

1. To evaluate the impact of 40(+) years of annual flooding on a bottomland hardwood stand.
2. To characterize the speciation of a bottomland hardwood stand following 40(+) years of annual flooding.
3. To evaluate the use of unusually large oak seedlings as regeneration stock in flooded areas.
4. To develop guidelines for the administration of the flooding regime to be used in a bottomland hardwood stand being used annually for waterfowl habitat. Variables will include flooding periodicity, water depth compartment inundation rotation and desirable species regeneration.

Synopsis of research activities per objective:

Objectives 1 & 2. A total of 327 inventory plots were measured throughout the stand. At each plot center, a nested plot design was used by measuring vegetation in the overstory, midstory, and at the regeneration level. Overstory plots were one-fifth acre in size. Within each circular plot, all overstory trees were identified to species and diameter was recorded. Midstory plots were one-fortieth acre in size. Within these, all midstory trees were identified to species, placed in height classes and diameter was measured. In one-hundredth acre regeneration plots, all woody stems less than five feet tall were identified and tallied

by species. Also, herbaceous plants were identified and percent ground cover was estimated for each species.

Objective 3. 2-0 bare-root and 2-1 potted Nuttall and willow oak seedlings were planted in an opening. Survival and growth was analyzed in 2005. Three midstory control plots were established and underplanted with 1-0 bare-root Nuttall and willow oak seedlings. Survival and growth were analyzed in 2006. Twenty four underplanting plots were established in 2007. The effects of midstory control and flooding on survival and growth of 1-0 bare-root willow oak seedlings will be analyzed in December 2008.

Significant findings/results per objective to date:

Vegetation data show a pronounced shift in species composition toward a more flood tolerant/shade tolerant/less desirable association. Artificial regeneration efforts indicate that artificial regeneration may be a viable option for obtaining advance oak regeneration; however, altering flooding periodicity will likely be necessary to achieve satisfactory survival and growth rates. Midstory control efforts indicate that midstory injection may be sufficient to create adequate light conditions for successful oak regeneration.

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**Project success relative to original objectives:**

All endeavors are on schedule and going well.

List post-docs and graduate students with title of thesis or dissertation, if completed, and estimated graduation date:

Guttery, M. 2006. Evaluation of artificial regeneration of oaks, willow oak acorn production, light conditions following midstory control, and the effects of long-term annual flooding on forest vegetative composition in an Arkansas greentree reservoir. Thesis, Department of Forestry, Mississippi State University.

Thornton, R.O. Expected graduation in 2008. Effects of midstory control, light availability, and winter flooding on artificial regeneration of willow oaks in an Arkansas greentree reservoir. Thesis, Department of Forestry, Mississippi State University.

Fund Leveraging

Monsanto Corp. and Five Oaks Wildlife Services	\$7,5000
BASF and Mississippi State University	\$19,000