THE PROBLEM OF PLANTING LOUISIANA SWAMPLANDS WHEN NUTRIA (MYOCASTOR COYPU) ARE PRESENT

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ABSTRACT

Logging of baldcypress (Taxodium distichum) in the swamps of the southeastern United States is once again becoming common and an area of particular concern in Louisiana is the regeneration of cypress in its natural environment. One way to ensure the proper stocking of cypress is to plant seedlings, but nutria usually damage or destroy newly planted seedlings and are a deterrent to cypress regeneration in flooded areas. In 1985 cypress seedlings were planted in a flooded logged area and in an area where flooding was preventing the establishment of natural seedlings. Nutria destroyed 86% of the seedlings in the Barataria watershed (logged area) and 100% in the Lake Verret watershed. One-half of the Barataria seedlings were protected with "Vexar" seedling protectors, but these were no deterrent to nutria. A second planting was made in the Lake Verret basin and the seedlings surrounded by chicken wire fencing. Nutria did no damage to the protected seedlings. A third planting was made in the Lake Verret area in September 1985 to determine if nutria would destroy late planted seedlings. Once again no nutria damage was observed. Implications are that spring-planted seedlings need protection to allow them to establish a root system making them more difficult for the nutria to pull up. Fall-planted seedlings appear to be less susceptible to damage because of the abundant food supply provided by aquatic plants that grow during the summer and fall. Once firmly established, cypress seedlings are less susceptible to nutria damage.

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INTRODUCTION

The nutria (Myocastor coypus) is a native of South America commonly found in low marshy places. The species was introduced into the United States as early as 1899 (Willner 1982). In Louisiana, nutria were first imported and released near Covington, but that population failed to survive (Kays 1956). O'Neil (1949) reported that 13 nutria were released in Iberia Parish in 1937 and other animals

were released in the St. Bernard and Orleans Parish marshes several times but a breeding population did not materialize. From 12 to 20 nutria were imported by McIlhenny at Avery Island in 1937 for experiments in pen raising nutria for fur (Kays 1956, Lowery 1974). In 1939 approximately 12 pair of the McIlhenny animals escaped into the marshes surrounding Avery Island. A hurricane in 1940 resulted in the release of another 150 animals. After this, landowners began releasing breeding stock into their marshes for fur and weed control. Two hundred and fifty nutria were released in the Mississippi River delta in 1951 and this population increased so rapidly that the marsh in the delta area was completely torn apart by 1957. By 1955-59, the nutria population in Louisiana was over 20 million animals (Lowery 1974).

Nutria were firmly established in the freshwater area between the Atchafalaya River and the Texas state line by 1950 (Atwood 1950) and north to the Red River by 1960 (Blair and Langlinais 1960). Today, substantial populations occur from Texas to Alabama, North Carolina to Maryland, and Oregon to Washington. Feral populations occur in 15-18 states (Willner 1982).

Nutria have been known to cause damage to newly planted cypress seedlings for some time. Nearly 1 million baldcypress seedlings were planted in 1949-51 in the swamp near Lac des Allemands by personnel of the Rathborne Lumber Company, Harvey, Louisiana, after harvesting (Bull 1949). Ninety percent of the seedlings planted in 1949 and 1950 survived into 1951 and grew 30 to 46 cm in height by the end of the 1950 growing season. An additional 141,262 seedlings were planted in early 1951 and survival was 80 to 95 percent (Rathborne 1951). Plans called for an additional 600,000 seedlings to be planted in 1951, but there is no record of what happened to those seedlings, although Brown and Montz (1986) reported that many of the seedlings were killed by animal browsing (nutria and rabbit) and the project was abandoned. During 1956-57 personnel from the Soil Conservation Service attempted to plant cypress seedlings in a cut-over swamp area in south central Louisiana. After four months, 90% of the seedlings had been destroyed, and nutria were suspected as the cause. The Soil Conservation Service subsequently recommended that the planting of baldcypress be suspended until some means of nutria control were perfected (Blair and Langlinais 1960).

METHODS

Three projects were conducted to determine the feasibility of planting cypress seedlings. The first project was a pilot project designed to determine if plantings were possible in the swamp environment and was con-

ducted in an unlogged and logged impounded area. The second project was conducted in three areas in the Barataria watershed all logged in 1983. The third project was conducted in the Verret watershed to determine the feasibility of underplanting cypress seedlings.

Project One

To test the feasibility of planting baldcypress seedlings in their natural environment, three 0.1 ha plots were established in the Barataria Basin and three in the Verret Basin in February 1984 (Fig. 1). In each plot, ten equally spaced lines radiating from the center of the plot were planted with one-year-old baldcypress seedlings obtained from the Louisiana Office of Forestry. Fifty seedlings were planted in each plot after the roots were pruned to 20 cm long. The seedlings were planted in standing water by grasping the seedling just above the root collar and inserting the root into the soft sediment until the hand was in contact with the sediment surface. All seedlings were measured for initial height after planting and survival was monitored monthly for three consecutive months and at the end of 1984.

Project Two

Starting in February 1985, 50-100 one-year-old baldcypress seedlings from the Louisiana Office of Forestry were planted in each of six plots within each of three 1983 logged areas in the Barataria basin for a total of 18 plots. In each plot, 20 equally spaced lines radiating from the center of the plot were established. Survival was monitored by periodic counts of the seedlings planted. The plots were monitored for two growing seasons to follow survival and growth of the planted seedlings.

Since nutria were shown to present a problem to newly planted seedlings in Project One (see Results and Discussion), one-half of the seedlings in all plots were protected with "Vexar" seedling protectors wired to the ground. These protectors are light-weight, relatively durable, and inexpensive (Anthony et al. 1978). They are also photodegradable with no known environmental hazards associated with the plastic or its by-products (Campbell and Evans 1975). Studies in the northwestern part of the U.S. found that even though rodents can chew through the plastic guards, survival was still relatively high (Anthony et al. 1978).

Project Three

At the Lake Verret site (Fig. 1), two plantings of baldcypress seedlings across a flooding gradient were made in 1985 (Flynn 1986). The first planting of 100 seedlings in each of the three areas – dry, semi-flooded, and flooded – was left unprotected and the second planting of 60 seedlings in each of the three areas was surrounded by

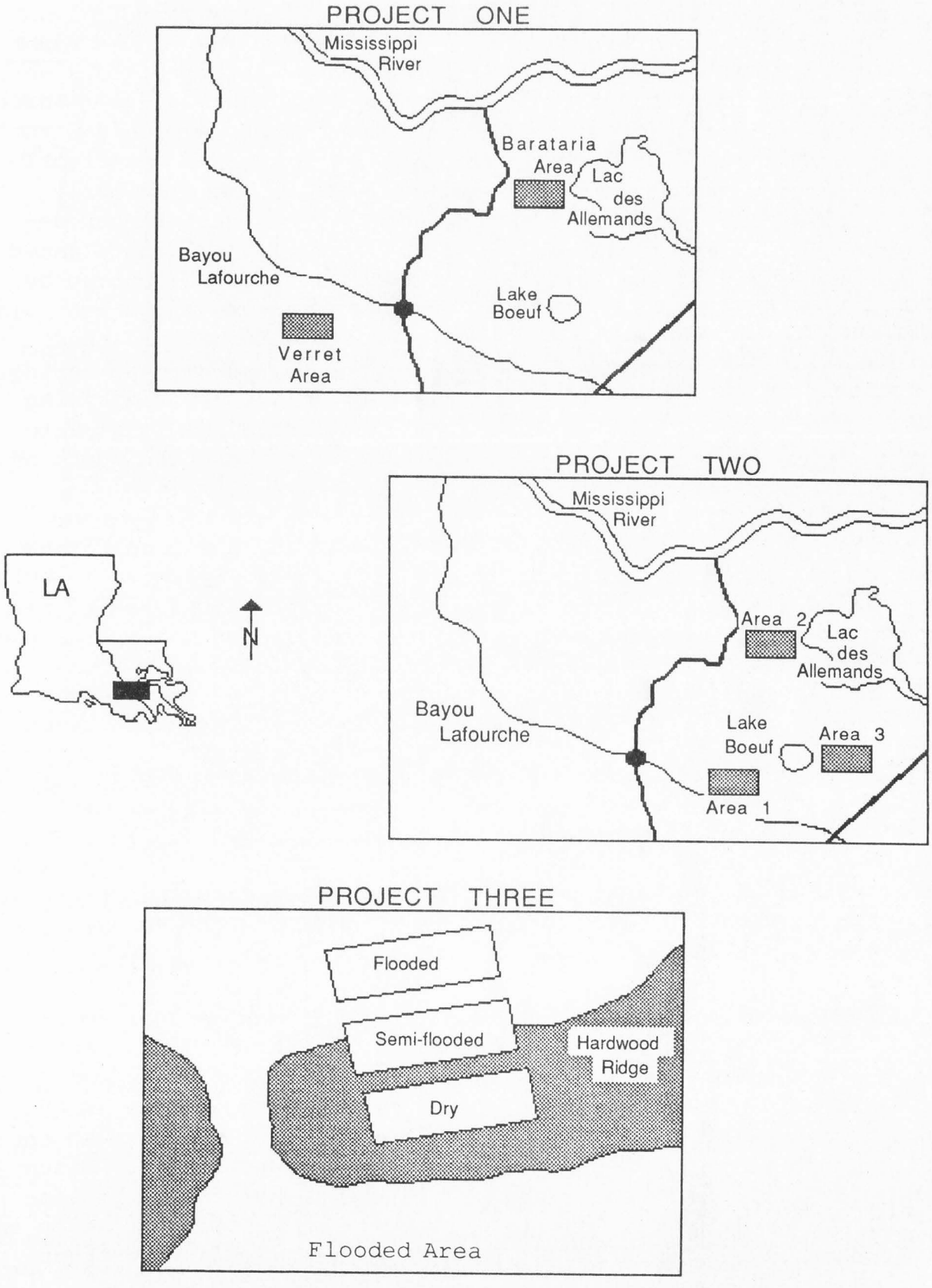

Figure 1. Generalized map showing the location of the three study areas used for determining baldcypress regeneration.

chickenwire fences. In addition, 25 baldcypress seedlings were planted again in September 1985 inside and outside of the chickenwire fences in each area to determine the effect of late season planting on the survival and growth of baldcypress. These seedlings were monitored for survival through the 1986 growing season.

RESULTS AND DISCUSSION

Project One

After three months only 14% and 7% of the seedlings were left in Barataria and Verret, respectively. Nutria had clipped and/or pulled the seedlings in both areas, and the tops were still lying next to the flags used to mark the location of the seedlings. By the end of the year, all of the seedlings had been destroyed.

Project Two

Nutria damage to the seedlings was quick and severe in most cases even with the Vexar guards (Conner and Toliver 1987). Nutria seemed to have very little trouble getting into the Vexar tubes. It appeared that they chewed a hole through the plastic netting at water level, clipped the seedling, and then pulled the tap root through the hole. In nearly every case, the stem of the seedling was left in the tube or adjacent to the tube. Rarely was anything except the bark of the tap root and root collar eaten.

In Area 2 of the 1983 logged plots (Table 1), four plots were planted on March 2, 1985. Three days later when we returned to finish planting two additional plots, 88% of the previously planted seedlings had been destroyed. All seedlings planted on this site were destroyed by the end of the second month. In Area 3, all of the unguarded seedlings were destroyed during the first month after planting, and the guarded seedlings were destroyed by the third month of the study (Table 1).

In Area 1, the pattern was different from the other plots. Of the six plots planted in this area, two were destroyed by the end of the second month. In the other four plots, only four guarded seedlings and twelve unguarded seedlings were eaten after nine months. The surviving seedlings are growing well, averaging over 24-40 cm of height growth in year 1 and 29-47 cm in height growth the second year. The average height of the seedlings after two growing seasons was 130 cm.

The only observed difference among the sites was the fewer number of nutria resting and feeding mounds in the relatively untouched plots (only 1 in the four plots versus 8/plot in the heavily damaged sites). Assuming that mounds are an indication of the nutria population in a given area, it appears that adequate seedling survival is dependent on the number of nu-

Table 1. Percent survival of underplanted baldcypress seedlings in three logged areas in Louisiana.

Area/Plot	1 mo	2 mo	3 mo	12 mo	24 mo
AREA 1					
1	100	100	100	98	98
2	100	100	100	100	100
3	100	100	100	92	92
4	100	100	100	78	74
5	100	0	0	0	0
6	100	0	0	0	0
AREA 2					
1	5	0	0	0	0
2	4	0	0	0	0
3	0	0	0	0	0
4	0	0	0	0	0
5	1	0	0	0	0
6	8	0	0	0	0
AREA 3					
1	76	38	0	0	0
2	40	40	0	0	0
3	100	20	0	0	0
4	38	1	0	0	0
5	18	2	0	0	0
6	20	0	0	0	0

tria in close proximity to the planted areas. However, Vexar seedling protectors provided little protection against nutria. If artificial regeneration of baldcypress is expected to succeed in areas densely populated with nutria, some other method of protection needs to be devised.

Project Three

Of the 100 unprotected seedlings planted in each of the Verret sites in February 1985, all were destroyed by the end of two months. Nutria were not known to be abundant in this area, but they obviously were a problem. Inside the chickenwire fences there was no problem with nutria predation. Survival at the end of 1985 varied from 88% to 94% in the different flooding zones (Table 2). By the end of 1986, survival in the flooded and semi-flooded areas had dropped to 70% and 64%, respectively. In the dry area, 91% of the seedlings survived through the second year. Growth of the seedlings varied across the flooding gradient with the flooded area > transition area > dry area.

Survival of the seedlings planted in September was variable, but little nutria damage was observed. In the dry area, survival was 84% both inside and

outside the fence, but the average height at the end of 1986 was 20 cm less outside the fence. This difference was due to deer browsing the outside seedlings. Deer have been identified as a problem with baldcypress seedlings planted in other areas (Faulkner 1985). In the semi-flooded area, survival was 88% inside the fence and 68% outside the fence. The lowest survival rate was observed in the flooded area (52% inside, 72% outside), but the majority of the seedlings died naturally. It was not until Hurricane Juan blew a tree down onto the fence in October 1985, that nutria were able to get into the fenced area. They immediately moved in and cleaned the area of herbaceous plants and built two mounds in the plot. However, after one year they had only destroyed two of the planted seedlings.

Even though the chickenwire fences provided excellent protection from nutria, the cost of this type of operation would probably be prohibitive to landowners. There has been some work with individual seedling wire tubes in Louisiana, but they were found to be difficult to make and install and did not work very well (Allan Ensminger, Wetlands and Wildlife Management Co., Belle Chasse, LA; pers. comm.).

Planting later in the year seemed to offer some hope of survival of planted seedlings. This may be related to the availability of food for the nutria. During winter, the herbaceous plants that nutria feed upon die and by spring food supplies are limited. By the end of summer, herbaceous plants, seedlings, and aquatic plants are abundant. The natural survival factor may be lower if seedlings are stored over the summer for late season planting, but they seem not to be bothered as much by nutria when planted at a later date. This is definitely an option that should receive further research.

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Table 2. Growth and survival of baldcypress seedlings underplanted in a Louisiana swamp forest

Area	1985		1986	
	% survival	ht. (cm)	% survival	ht. (cm)
Dry	94	59.6	91	69.6
Semi-flooded	91	63.5	64	78.7
Flooded	88	82.8	70	106.1

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