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Impoundment and Baldcypress Swamp Management

By Beth A. Middleton[1]

Baldcypress swamps (*Taxodium distichum*) are impounded for many reasons, but this practice results in the demise of the swamp. The permanent impoundment of baldcypress swamps first lowers primary production and eventually results in death of the trees (Fig. 1; Penfound, 1949; Eggler and Moore, 1961; Harms and others, 1980; Conner and Day, 1988, 1992; Heitmeyer and others, 1989; Loftus, 1994; Osment-DeLoach and Moore, 1996). Individuals of most species die if they are flooded continuously above the root collar for 1 to 6 years (Yeager, 1949). The most likely cause of death and low production in impounded conditions is the low available oxygen levels in the tree roots, where the carbohydrate reserves are stored (Harms and others, 1980). Trees begin to show decline when the major growth regions of the trees are near the trunk and not near the branch tips (Klimas, 1987). Managers should avoid impounding baldcypress swamps for long periods of time because of the relationship of tree death to long-term flooding.

Figure 1. The detrimental effects of permanent impoundment are evident in this swamp, known locally as Henderson Swamp, in the Atchafalaya Basin Floodway of southern Louisiana.

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Another reason that managers should avoid the permanent flooding of these forests is that production levels are lower in impounded situations than they are in natural swamps with flood pulsing (Broadfoot and Williston, 1973; Conner and others, 1981; Mitsch and others, 1991; Conner and Day, 1992; Megonigal and others, 1997; Conner and Buford, 1998; Watt and Golladay, 1999; Middleton and McKee, 2005). As primary production declines, the amount of material available to wildlife species also becomes lower, and a decline in the fishery or wildlife population may be detected about 10 years after impoundment (Young and Crew, 1982). During a study of impoundment in Illinois, production was reduced from 1992 to 1998 in the permanently flooded parts of Buttonland Swamp (a National Natural Landmark) by about one-half, although it is not known what the minimum level of production is before trees begin to die (Middleton and McKee, 2005). The regeneration of trees was limited to the margins of the swamp because trees can only germinate and establish in drawn down conditions (Middleton 1999, 2000).

Wildlife production is also reduced by swamp impoundment. For example, a dam was constructed to improve sport fishing in Dead Lake along the Chipola River in Florida. Fishing increased for a time after the construction of the impoundment, but then fish populations began to decrease after 10 years (Young and Crew, 1982). Consequently, the dam was removed and the fishing and water quality improved (Hill and Hardin, 1993).

From a management perspective, any impoundment developed for for fisheries or wildlife purposes needs a drawdown for periods of time during the summer growing season. In cases where drawdown is reestablished after 1 year (but not more than 5 years), species such as baldcypress trees recover rapidly (Duever and McCollom, 1986). Tree regeneration of baldcypress also may occur (Keeland and Conner, 1999) in the presence of a seed bank (Middleton, 2003). The effects of impoundment seem particularly severe in the South (Middleton and McKee, 2005), so managers should take care to include at least a short period of drawdown during the summer growing season, especially in southern swamps. Managers should create impoundments in baldcypress swamps judiciously and recognize that swamps can not tolerate permanent inundation.

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