building levees and flooding the areas to be harvested could be modified to enhance regeneration. Seed trees should be left uncut and standing water maintained inside the levees during the winter after harvest to allow seeds to soak. In spring, the water level could be drawn down to the surface to allow germination.

Although the use of large machinery appears attractive, especially for harvesting large swamps, the long-term costs of impairment of regeneration and reduced site quality can be significant (Fig. 11). Degree of soil compaction and its effect on regeneration are important issues. Harvesting timber in small blocks and cutting with chain saws instead of feller-bunchers may prove less costly in the long run.

Burning

Although Wade et al. (1980) suggested that no special fire schedule is needed in south Florida cypress domes, many Florida swamps exist in areas no longer subject to natural fire regimes. There is little specific information available to recommend a pattern of prescribed burning for cypress swamps, although some general guidelines can be proposed.

Pondcypress is adapted to more frequent fires than baldcypress, and ponds probably burn more frequently than strands. If pondcypress swamps are not burned frequently enough, understory vegetation may prevent enough light from penetrating to allow cypress regeneration, and succession to a bayhead or mixed hardwood swamp may ensue. However, if cypress swamps are burned too often, the growth of mature trees may be retarded, and seed sources and young trees will be destroyed. Allowing a fire to burn through a swamp when the moisture content of its organic soil falls below 65% can generate a peat fire that can destroy not only seeds and saplings but also the roots of mature trees. Heartrot may result if organic matter burns deep beneath a tree's roots.

Fig. 11. Skidder trail left after logging in a central Florida swamp.

It is risky to use fire following a cypress harvest to reduce slash and to control competing vegetation. Too much fuel will cause an excessively hot fire, which could destroy seeds, saplings, and seed trees; very hot fires also eliminate the ability of stumps to sprout. If the fuel load is light and the soil is wet, a carefully controlled surface burn could be used.

Multiple-Use Management

The use of cypress swamps for additional treatment of secondarily treated wastewater does not appear to conflict with wood production. The increased growth rates of trees in pondcypress stands receiving wastewater indicate that the two uses are compatible. Although reproduction by seed is difficult because of continually high water levels, planted seedlings can survive in such swamps.

To date, only small swamps have been recommended for use in wastewater treatment. Using cypress domes for disposal would alleviate some of the problems of groundwater pollution from septic tanks in rural areas, and using small strands may be an economical alternative to construction of expensive tertiary treatment plants in small towns. However, the effects of wastewater on wood quality and the effects of soil compaction caused by harvesting on the water treatment function are unknown.

Harvest scheduling should be based on the distribution of cypress swamps in the landscape, not just on the amount of standing timber. Rather than cutting all the cypress in one place in a given year, harvests can be done in small, widely scattered patches in order to maintain an even distribution of mature forest cover and wildlife habitat. Although transporting equipment and logs to carry out such a cutting design is more costly, planning timber harvests on a landscape basis can preserve the important ecological roles of cypress swamps for flood mitigation, wildlife habitat, and water conservation.