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13.4.10. Control of Willow and Cottonwood Seedlings in Herbaceous Wetlands

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Willow and cottonwood are common species in forested wetlands and occur throughout most riparian and floodplain habitats of North America. These woody species are especially common in early successional stands where seasonal flooding occurs regularly. Cottonwood and willow are often considered problem plants, because they rapidly invade wetlands dominated by herbaceous flora and can form dense, extensive stands. The shade created by these species eliminates herbaceous undergrowth, and once the sapling stage is reached, cottonwoods and willows are difficult to eradicate. Control of these species can be costly and varies considerably with latitude.

Willow and cottonwood growth may be undesirable where intensive management of seasonally flooded impoundments is encouraging herbaceous growth or where levee structures could be compromised because of root intrusion. If woody plant control is a priority, life history responses within specific regions must be identified before attempting specific management manipulations. For instance, at more northern sites, seedlings and saplings that have been mowed can be controlled by shallow flooding. However, summer flooding at more southern sites is difficult because of evapotranspiration and can, in fact, accelerate growth. Control in these southern areas may best be achieved by taking advantage of summer droughts.



A complete drawdown of an impoundment during the hottest days of summer prevents development of extensive root systems in newly established seedlings. Shallow discing at this time ensures destruction of newly established seedlings and disrupts the root systems of older plants. Drawdowns that expose expanses of mudflats before seed dispersal may enhance germination of woody species adapted to wet sites at southern latitudes, whereas drawdowns after seed dispersal reduce establishment of woody growth and confine it to narrower mudflat zones. Deep flooding that covers all aboveground growth can eliminate young seedlings.

Techniques for physical disturbance include several options. Shallow discing is a traditional technique that destroys both above- and below-ground growth, yet is economical. A double cross-disc is most effective in dense stands. Discing twice, or even three times, in a growing season may be most effective for controlling young woody growth. Drought conditions may allow more opportunities for discing. When sapling size reaches approximately a 3-in. stem diameter, discing becomes ineffective. Mowing with a bushhog is an option even after discing is infeasible, but root systems are not modified. Additionally, multiple shoots will develop from most severed trunks. Fall mowing, followed by flooding throughout the next growing season, may effectively control willow saplings. When stem diameters reach 4 in. or greater, bulldozers may be the only realistic option for control. Large earthmoving equipment is not always an option because it

- is expensive
- requires experienced operators

- requires dry impoundments
- removes some of the topsoil
- destroys natural swales
- deepens ditches and swales, thus increasing volume of water retained and
- compacts the soil.

Chain saws may be used on large trees, especially if only a few trees present problems. This technique is time consuming and leaves stumps that may rapidly sprout unless treated with herbicides.

Herbicides are a chemical option, but chemicals and application are usually costly. Furthermore, chemical use is often restricted in aquatic systems and on public lands. Although chemicals are expensive, their use may be more economical than control with heavy equipment in some situations. Some chemicals may have residual effects on desired vegetation and future plant growth. Use of chemical control must be carefully balanced with other options before implementation. Chemicals may play a particularly important role on some sites that are inaccessible or cannot be disced because of vegetative structure or flood debris.

Control of woody species requires major management costs in labor, fuel, and machinery. Costs for control by discing willow seedlings or early sapling growth at the Ted Shanks Wildlife Management Area, Missouri, are \$3,000/year or more on the 2,470-acre (1,000-ha) tract managed for moist-soil and agricultural crops. Control of older woody stands with bulldozers may require expenditures

in excess of \$10,000. On sites suitable for agricultural crops, alternating years of cultivation offers good short-term control.

Managers should be cautious when modifying natural sites that are dominated by willow and cottonwood. This habitat should be viewed as an integral component of a wetland complex that provides somewhat different sources of food and cover than other wetland types. Although extensive stands of these woody species may seldom be used, creating openings or increasing the amount of edge may be less costly and may provide needed resources for some species. Recent evidence suggests that leaf litter may be especially important in maintaining crustacean populations, which are critical food sources for hooded mergansers, mallards, wood ducks, yellow-crowned night-herons, and others. The structure of older trees may also provide important cover and nest sites for colonial waterbirds and passerines such as willow flycatchers and yellow warblers. Beaver impoundments throughout the continent are often dominated by willow and cottonwood. Such natural areas can only be degraded by the control of woody plants. Cottonwood and willow are usually least desirable when they occur as extensive monocultures. A mixture of these species with others usually provides desired food and cover in wetlands. Thus, management planning should consider woody species in long-term habitat objectives.

Appendix. Common and Scientific Names of Plants and Animals Named in Text.

Plants

Eastern cottonwood	<i>Populus deltoides</i>
Fremont cottonwood	<i>Populus fremontii</i>
Willow	<i>Salix</i> spp.

Birds and mammals

Wood duck	<i>Aix sponsa</i>
Mallard	<i>Anas platyrhynchos</i>
Willow flycatcher	<i>Empidonax traillii</i>
Yellow warbler	<i>Dendroica petechia</i>
Hooded merganser	<i>Lophodytes cucullatus</i>
Yellow-crowned night-heron	<i>Nycticorax violaceus</i>
Beaver	<i>Castor canadensis</i>



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