

5.14 Managed Areas and Ecologically Significant Sites

5.14.1 Introduction

Changes in reservoir operations are not likely to eliminate or alter the boundaries of managed areas and ecologically significant sites. Reservoir operations changes, however, could affect the resources that managed areas were established to address, thereby affecting their integrity. As described in Section 4.14, the most frequently cited management objectives for potentially affected managed areas and ecologically significant sites are protection of state- and federal-listed species, water-dependent bird habitat management, and recreation use. Habitat protection is an underlying objective of most managed areas and ecologically significant sites. Managed areas on reservoir or tailwater shorelines are most vulnerable to direct impacts, while upland and headwater areas are less vulnerable and therefore were eliminated from further assessment.

Potential indirect effects of increased shoreline development—including habitat fragmentation, the spread of invasive species, the presence of feral animals, increased visitor pressure, sedimentation, and erosion—were considered negligible, because only the rate of development may vary among alternatives (see Section 5.15, Land Use), and not, ultimately, the location or amount of developed acreage.

5.14.2 Impact Assessment Methods

The effects of each policy alternative on managed area resources and uses, including wetlands, terrestrial ecology, endangered and threatened species, and recreation, are addressed in Sections 5.8 (Wetlands), 5.10 (Terrestrial Ecology), 5.13 (Threatened and Endangered Species), and 5.24 (Recreation), respectively.

The evaluation in Section 5.8, Wetlands, included wetland attributes such as location, type, and function, as well as managed wetlands such as those subimpoundments that are seasonally drained and flooded for waterfowl management purposes. The integrity of some of the largest managed areas relies on the ability to raise and lower water levels in these managed wetlands. Many managed areas and ecologically significant sites also protect “unmanaged” wetlands for wildlife or endangered species habitat; therefore, all wetland types and functions are critical to the integrity of managed areas and ecologically significant sites.

The most likely effects of changes in reservoir operations on terrestrial ecology (see Section 5.10, Terrestrial Ecology) would be to lowlands and reservoir-associated wildlife. Particularly vulnerable resources include bottomland hardwood forests, scrub/shrub wetlands, annual flats plant communities, and globally rare wetland communities—many of which are protected within managed areas and ecologically significant sites.

Many threatened and endangered species occur in managed areas and ecologically significant sites, some of which were established to conserve these species. Those most likely to be affected by changes in the reservoir operations policy are the aquatic species along the least

5.14 Managed Areas and Ecologically Significant Sites

modified stream reaches, including warm tributary tailwaters, flowing mainstem reaches, some pooled mainstem reaches, and cool-to-warm tributary tailwaters (see Section 5.13, Threatened and Endangered Species). Alternatives that alter water temperature, DO, and quantity of water may produce conditions more or less similar to the natural conditions in which threatened and endangered species thrive.

For each policy alternative, the combined effects on the resources described above were evaluated for significance to the operational integrity of managed areas and ecologically significant sites as a group, because many of these sites fulfill multiple and varied management objectives. The evaluations focused on wetlands and managed subimpoundments, the managed area resources with the greatest potential to be affected by the policy alternatives.

5.14.3 Base Case

Under the Base Case, managed areas and ecologically significant sites would remain in their current state of management, subject to natural fluctuations. In general, these sites meet their management objectives under existing operating conditions and would continue to do so. The general trend of slight shifts in wetland location, type, and function (see Section 5.8, Wetlands) would have little effect on managed area integrity. The stress exhibited in some bottomland hardwoods, particularly water tupelo, from excessive periods of inundation under the current water regime (see Section 5.10, Terrestrial Ecology) could affect the integrity of a few sites such as the 281-acre Muddy Bottoms TVA HPA on Wheeler Reservoir and portions of the 34,500-acre Wheeler NWR.

5.14.4 Commercial Navigation Alternative

Conditions under the Commercial Navigation Alternative would be generally similar to those for the Base Case. The greatest change affecting managed areas would be the higher winter pools and slight increases in the duration of water cover over flats and shoreline. This would adversely affect management of migratory shorebirds while slightly benefiting other wildlife. Management of waterfowl subimpoundments in refuges and waterfowl management areas on Kentucky, Barkley, and Wheeler Reservoirs may be adversely affected if higher late-winter and spring water levels hinder their dewatering.

5.14.5 Reservoir Recreation Alternative A and Tailwater Habitat Alternative

Under Reservoir Recreation Alternative A and the Tailwater Habitat Alternative, mean summer pool duration and winter pool elevations would increase on many mainstem reservoirs and selected tributary reservoirs. This increase in water availability would benefit aquatic bed wetlands but would result in slightly adverse effects on other wetland types (primarily flats, scrub/shrub, and forested wetlands, and associated wildlife), and adverse effects on late-summer and early-fall migrating shorebirds targeted by many of the state and federal wildlife refuges. Higher winter water levels on Wheeler and Douglas Reservoirs could adversely affect the management of waterfowl impoundments as described for the Commercial Navigation Alternative. Overall, Reservoir Recreation Alternative A and the Tailwater Habitat Alternative

5.14 Managed Areas and Ecologically Significant Sites

would result in slightly adverse to beneficial effects on managed areas and ecologically significant sites.

5.14.6 Reservoir Recreation Alternative B and Tailwater Recreation Alternative

Under Reservoir Recreation Alternative B and the Tailwater Recreation Alternative, mean summer pool duration would extend several weeks longer than under Reservoir Recreation Alternative A, and winter pool elevations would increase on many mainstem reservoirs and selected tributary reservoirs. The timing of the increase in water would slightly benefit some wetlands and wildlife habitat functions but would adversely affect flats, scrub/shrub, and forested wetlands, hindering protection of these wetland types in areas such as Rankin Bottoms. These alternatives also would increase the risk of crop flooding in waterfowl subimpoundments on Kentucky, Wheeler, and Douglas Reservoirs. The overall effects of these two alternatives on managed areas and ecologically significant sites would be slightly adverse.

5.14.7 Summer Hydropower Alternative

Under the Summer Hydropower Alternative, summer pool duration would be shorter than under the Base Case due to increased power production, and winter pools would be higher on tributary reservoirs. The resulting shifts in reservoir-dependent wetlands would occur too quickly for adaptive changes (Section 5.8, Wetlands), resulting in a substantially adverse effect on wetlands in managed areas. The delayed filling and early drawdown on mainstem reservoirs could have a beneficial effect on waterfowl subimpoundments by facilitating spring dewatering and reducing summer flood risk and subsequent crop loss. Invasive species may become problematic in managed areas. Bottomland hardwoods and some globally imperiled plant communities could be substantially adversely affected by the prolonged drawdown that would allow upland plants to invade and alter community composition. Overall, the Summer Hydropower Alternative would adversely affect many managed areas and ecologically significant sites.

5.14.8 Equalized Summer/Winter Flood Risk Alternative

The higher winter pools and lower but extended summer pools of the Equalized Summer/Winter Flood Risk Alternative would result in slightly adverse impacts on lowland plant communities, including flats, scrub/shrub, and forested wetlands, and associated shorebirds and protected species within managed areas. Low summer pools and delay in filling could hinder waterfowl management by reducing cover and foraging habitat in shoreline wetlands and by reducing late-season flooding opportunities on croplands managed for waterfowl. Higher winter water levels would impair habitat for migrating shorebirds. However, the risk of premature flooding of cropland for wildlife may be reduced by the delayed spring fill associated with this alternative (see Section 5.10, Terrestrial Ecology). The overall combined effects of the Equalized Summer/Winter Flood Risk Alternative on managed areas and ecologically significant sites would be adverse, but slightly less adverse than those for the Summer Hydropower Alternative.

5.14 Managed Areas and Ecologically Significant Sites

5.14.9 Preferred Alternative

Under the Preferred Alternative, mean summer pool duration and winter pool elevations would increase on many mainstem reservoirs and selected tributary reservoirs. The increase in summer pool duration would result in the same variable impacts on wetlands, migrating shorebirds, and waterfowl subimpoundments as described for the Reservoir Recreation Alternative A and the Tailwater Habitat Alternative. The 0.5-foot increase in winter pool elevations on Wheeler Reservoir would likely have minimal effects on Wheeler NWR subimpoundments. Due in part to concerns over impacts on wildlife refuges, operating guide curves on Kentucky Reservoir would not be changed. Consequently, there would be no material changes in the operation of Kentucky and Barkley Reservoirs and thus no effects on managed areas and ecologically significant sites, including the Tennessee and Cross Creeks NWRs. Overall, the Preferred Alternative would result in slightly adverse effects on managed areas and ecologically significant sites.

5.14.10 Summary of Impacts

Reservoir operations that extend full pool into the fall migration season and increase winter water levels (Reservoir Recreation Alternative A, Reservoir Recreation Alternative B, the Commercial Navigation Alternative, the Tailwater Recreation Alternative, the Tailwater Habitat Alternative, and the Preferred Alternative) would generally hamper management of waterfowl and/or shorebird habitat in managed areas on reservoirs. These alternatives also would affect some imperiled plant communities, scrub/shrub, and forested wetlands in managed areas and ecologically significant sites. For Reservoir Recreation Alternative B and the Tailwater Recreation Alternative, these effects would result in slightly adverse impacts on managed area integrity. For Reservoir Recreation Alternative A, the Commercial Navigation Alternative, the Tailwater Habitat Alternative, and the Preferred Alternative, these impacts may be partially offset by beneficial effects on some wetland types, associated wildlife, and other managed area resources. The resulting overall effects under these alternatives would be slightly adverse to slightly beneficial. The Summer Hydropower Alternative and the Equalized Summer/Winter Flood Risk Alternative would result in the greatest adverse effects on managed areas, affecting wetland/waterfowl management efforts and other resources.

5.14 Managed Areas and Ecologically Significant Sites

Table 5.14-01 Summary of Impacts on Managed Areas and Ecologically Significant Sites by Policy Alternative

Alternative	Description of Impacts
Base Case	No change – Continued difficulty in protecting integrity of bottomland hardwoods (e.g., Muddy Bottoms TVA HPA and Wheeler NWR) and some aquatic endangered species sites.
Reservoir Recreation A	Slightly adverse to slightly beneficial – Effects on certain wetlands; adverse effects on waterfowl subimpoundments and migratory shorebird habitat.
Reservoir Recreation B	Slightly adverse – Effects on waterfowl subimpoundments, habitat for some migratory birds, and scrub/shrub and forested wetlands, beneficial effects on aquatic bed wetlands and associated wildlife.
Summer Hydropower	Adverse – Substantially adverse effects on wetlands; no change to beneficial effects on waterfowl sub-impoundments.
Equalized Summer/Winter Flood Risk	Adverse – Adverse effects on waterfowl subimpoundments, flats, scrub/shrub, and forested wetlands and on some associated wildlife; slight benefits to some wildlife on tributary reservoirs.
Commercial Navigation	Slightly adverse to slightly beneficial – Generally similar to Base Case; continued difficulty protecting integrity of some bottomland hardwoods (e.g., Muddy Bottoms TVA HPA and Wheeler NWR).
Tailwater Recreation	Slightly adverse – Adverse effects on waterfowl sub-impoundments and some other migratory bird habitat, and on protection of scrub/shrub and forested wetlands; slightly beneficial effects on aquatic bed wetlands and associated wildlife.
Tailwater Habitat	Slightly adverse to slightly beneficial – Effects on certain wetlands and lowland habitats; beneficial effects on aquatic bed wetlands; and adverse effects on managed subimpoundments and migratory shorebird habitat.
Preferred	Slightly adverse – Effects on migratory shorebird habitat; variable impacts on wetlands and waterfowl subimpoundments; and overall slightly adverse effects.

HPA = Habitat Protection Area.

NWR = National Wildlife Refuge.

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