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Interagency Guidance Concerning Authorization, Siting, Construction and Management of Greentree Reservoirs

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Underwriting Agencies: USDA, Natural Resources Conservation Service; U.S. Army Corps of Engineers, Charleston District; U.S. Fish and Wildlife Service, Charleston Field Office; National Marine Fisheries Service, Charleston Habitat Office; U.S. Environmental Protection Agency; South Carolina Department of Natural Resources; South Carolina Department of Health and Environmental Control.

BACKGROUND

Greentree reservoirs (GTRs) are managed forested wetland systems which promote seasonal flood cycles to enhance feeding and foraging habitat for a wide range of wetland dependant wildlife species. As with most other habitat manipulations, there are risks that other ecosystem functions, including habitat loss for nontargeted species, may be temporarily altered or interrupted, or ecosystem integrity itself may be impaired. Besides the direct loss of wetlands from embankment construction, overly intensive GTR management can severely alter the long-term integrity of bottomland hardwood systems (Weller 1989, King 1994). By affecting seed dispersal mechanisms, germination, seedling survival, overstory mortality and windthrow susceptibility, GTRs can effect a long-term shift in vegetative composition.

However, in appropriate locations and circumstances and within appropriate design, construction and management constraints, direct impacts such as temporal shifts in wetland functions, long-term forest health and vigor, and seasonal habitat loss to non targeted wildlife species can be minimized while providing enhanced habitat for a host of wildlife including waterfowl. In some cases, GTR strategies can also be effective restoration and management tools in areas where hydrology has been altered (King & Allen 1996).

Under provisions of Section 404 of the Clean Water Act, regulatory and resource agencies are often tasked with sorting the benefits and detriments of specific GTR proposals. State and Federal resource agencies often provide technical assistance to landowners interested in establishing a GTR on their property.

This document supplements the greentree reservoir guidance contained in the “Inland Impoundment Policy” of the South Carolina Wildlife and Marine Resources Department (currently the South Carolina Department of Natural Resources) dated May 25, 1989.

PURPOSE

The purpose of the following interagency guidance for greentree reservoirs is to better serve the public by: (1) providing a technical framework by which landowners can predetermine project success in achieving management objectives; (2) providing consistent standards by which regulatory agencies can systematically determine positive and negative wetland impacts; (3) providing information to aid in avoiding common project design pitfalls that detract from the net habitat enhancement and may hinder the project's ability to be "self mitigating" relative to satisfying avoidance, minimization and compensation criteria; and (4) providing greater permitting predictability.

Proposals meeting the siting, construction and management guidance criteria contained below can provide substantial wildlife habitat benefits with minimal impacts on other wetland functions and values. Therefore, such proposals will generally receive a favorable review. These projects may also be "self-mitigating" relative to satisfying avoidance, minimization and compensation criteria. Alternatively, those proposals which do not meet the guidance criteria may require compensatory mitigation including buffers, easements or deed restrictions or may not be permitted. In any case it should be recognized that GTR creation and management imposes some environmental risks in order to achieve specific management benefits. It should only be attempted at suitable sites. Applicants should be aware that GTR management can be labor-intensive and require long-term commitment. They should also be aware that authorization of these projects will contain remediation requirements in the permit conditions should management be discontinued or not properly pursued, or if the activity results in degradation of the habitat such as adverse effects on desirable tree species.

GUIDANCE CRITERIA

In order to fulfill the goals of this guidance, applications for GTRs should contain sufficient information to allow determinations relative to these criteria. They must contain a management plan that will encompass the management criteria below.

I. Site Suitability Criteria

A. Suitable sites avoid areas where GTRs would adversely affect threatened or endangered species, bird rookeries, trout streams, and or waters designated as outstanding resource waters (ORW) by the SC Department of Health and Environmental Control under Regulation 61-69. New embankments will not be considered in designated ORW areas.

B. The site should require a minimum of embankment construction to accomplish water control. Favored sites contain natural grade controls or other existing embankments (e.g. roads, railroad grades, rice field dikes, etc...)

C. Site topography should be near flat with slope not to exceed 1% (one foot rise per hundred foot length).

D. Soils should have low permeability thereby allowing for proper water level maintenance.

E. The site should be dominated (50% or more) by a hard mast producing hardwood component (i.e., oaks) and should include trees currently producing adequate mast to provide forage for ducks and other species of wildlife.

F. Areas subject to tidal influence and/or long periods of inundation, such as cypress/tupelo forests, are generally not suitable sites.

G. Sites that require impoundment of perennial streams and primary river floodplains are not suitable.

H. The site should be adequately sized to accomplish the project purpose and should facilitate a low ratio of dike fill to reservoir size (e.g., 1:50, not 1:5).

I. Areas of heavy beaver activity are generally not recommended sites.

II. Construction Criteria

A. Soil material for dike construction should be non-contaminated and come from an appropriate upland source outside of the reservoir area. Material should be clean earthen fill suitable for maintaining a steep slope.

B. Dikes should not exceed a bottom width of 20 feet; however, smaller dikes are encouraged.

C. Dike height should be limited to a design that allows a maximum of one foot of free-board with an average depth of flooding of 6-18 inches.

D. Dikes should be located to minimize impacts to mature trees and should take advantage of existing high ground such as roads, river berms, railroad tracks, old dikes and/or other disturbance corridors.

E. Water control structures (flash board risers) should be flush with the base level of the reservoir (the base level of the streambed when present) to allow for unimpeded passage of aquatic organisms and complete drawdown during the non-flooded seasons.

F. Where appropriate, project design should include emergency spillways to prevent dike failure due to heavy rain or other flooding events.
G. In areas subject to beaver activity, measures such as the installation of beaver pond levelers and/or emergency drainage systems are necessary to maintain control of water levels.
H. Dike construction should occur during dry periods.
I. Construction access impacts should be limited to the footprint of the dike.
J. The following best management practices should be followed during construction.
   (1) Prior to the beginning of any construction activities, appropriate erosion control measures, such as silt fences, silt barriers or other suitable devices, will be placed between the construction area and affected waterways (wetlands); and maintained in a functioning capacity until the area is permanently stabilized upon project completion.
   (2) In areas where silt barriers cannot be effectively employed, mulching, burlap or other suitable materials will be applied and maintained on all disturbed land surfaces to control erosion until the area can be permanently stabilized.
   (3) All steps necessary will be taken to prevent oil, tar, trash, debris and other pollutants from entering adjacent wetlands and/or waterways.
   (4) Once initiated, the project will be carried to completion in an expeditious manner in order to minimize the period of disturbance to the environment.
   (5) Upon completion, all disturbed areas will be promptly and permanently stabilized with vegetative cover.
   (6) Construction activities will avoid to the greatest extent practicable, encroachment into any wetland areas not designated as fill for dike construction.

III. Management Criteria

A. Flooding shall not commence until November 1.
B. To ensure that foods are available to dabbling ducks, GTRs should be gradually flooded to a depth of six to eighteen inches, with a maximum of twenty-four inches (excluding channels).
C. Gradual drawdown shall begin early enough in February to ensure that the majority of the impoundment is totally dried to bed level by March 1 unless precluded by natural flooding.
D. Water control structures shall remain open during time of drawdown to facilitate water, nutrient and/or organism exchanges.
E. The reservoir shall not be flooded more than three consecutive years followed by at least one dry year with control structures completely open. This will result in reducing water stress that could be responsible for declines in growth and mast production, poor natural regeneration and/or mortality often associated with hydrological changes of the soil.
F. Snags will be allowed to remain standing to provide habitat for cavity nesting species.
G. No timbering or significant modification to existing wetland vegetation shall occur within the impoundment. Any forest manipulation within the impoundment shall be conducted in accordance with a management plan approved by the regulatory and review agencies through the permitting process and shall be restricted to those activities that promote the growth of mast producing trees.

Literature Cited

King, S.L. 1994. The effects of flooding regimes and greentree reservoir management on succession of bottomland hardwoods. PhD. Dissertation. Texas A&M University, College Station, TX, USA.

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