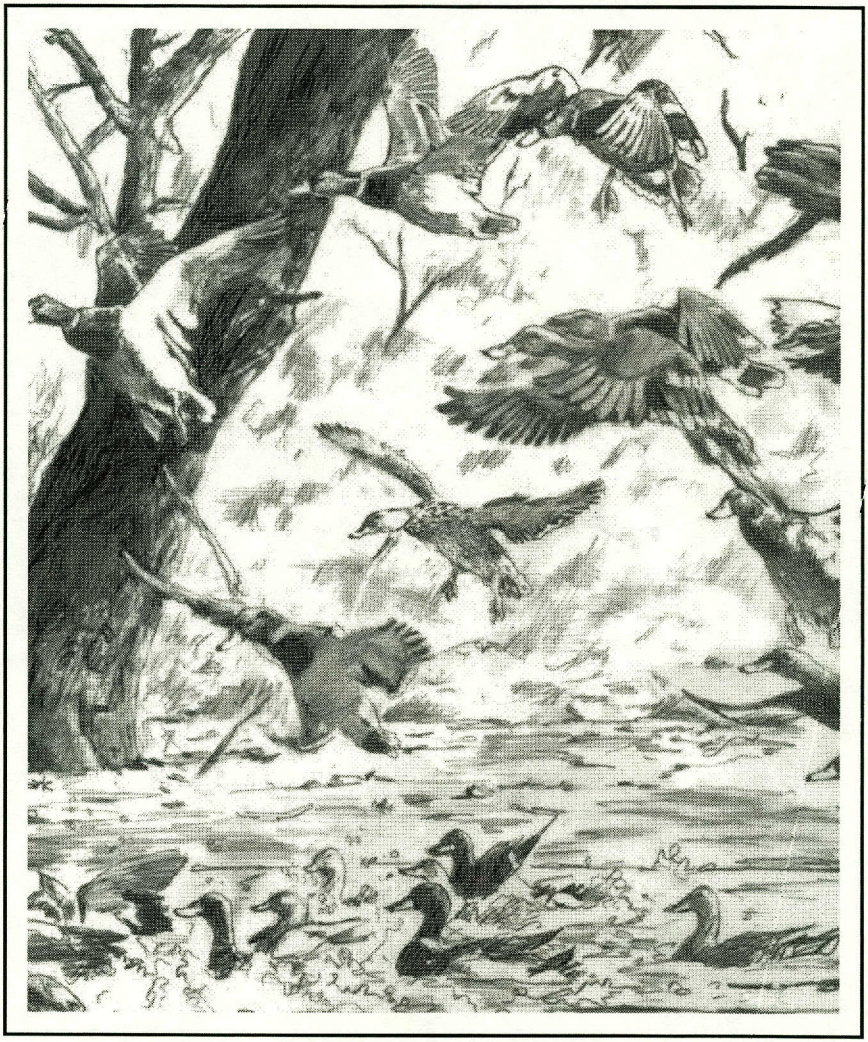
TEXAS PARKS AND WILDLIFE

GREEN-TREE RESERVOIR MANAGEMENT



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GREEN-TREE RESERVOIR MANAGEMENT

A green-tree reservoir (GTR hereafter) is a forested lowland that is temporarily flooded during fall and winter to attract ducks, mainly mallards and wood ducks. It is designed to hold water while trees are dormant. This prevents permanent tree damage and possible death; hence the name "green-tree" reservoir.

Most GTRs are created by the construction of levees (or the extension of naturally occurring ridges) and the installation of water control structures. GTRs provide suitable waterfowl shooting areas and important feeding and loafing sites during fall and winter months. The flooding of bottomland hardwoods to a depth of 1-18 inches provides ducks access to fallen acorns and other seeds. Some of the more successful GTR projects are near Struttgart, Arkansas, and in the Noxubee National Wildlife Refuge, Mississippi.

Earlier proponents of GTRs have mentioned that only oaks, water and ducks are needed for success. However, this is an oversimplified formula. The following sections provide directions to get started with a GTR project.

Feasibility factors for a GTR are:

1. A preponderance of bottomland hardwood oaks, gums and ashes at least 40 years old should be present.
2. A minimum of 10 acres is recommended in order to attract ducks on a regular basis.
3. The area should be relatively flat to maximize flooded acreage of a depth of 1-18 inches.
4. The soils should have good water holding capabilities. Impervious clays are best.
5. Dependable water supplies must be present. Potential sources are: a nearby water storage reservoir at a higher elevation; pumping ground water or surface water (nearby stream or pond); natural rainfall and drainage; and temporary diversion or blockage of minor streams. Using water from a storage reservoir or collecting rainfall and runoff are the best alternatives; however, during some years these preferred methods may not provide enough water.
6. Proximity to traditional waterfowl wintering grounds and flight paths.

Construction

Levee

1. The topography of the site should be surveyed and a levee designed and located to flood the maximum number of hardwood acres to a depth of 1-18 inches. In some cases it might be necessary for water at the dam to be several feet deep in order to increase acreage in the upper end of the GTR.
2. The GTR levee location must have easy access by vehicle for construction, maintenance and management.
3. Pre-existing elevated roads, trams or natural ridges should be used as part of the levee in order to lower costs. Sometimes only minor work is needed on these structures to provide a suitable dam.
4. It is preferable but not essential for the top of the levee to be wide enough to drive a maintenance vehicle on. At least 4 feet in width is needed for small off-road vehicles and 10 feet for standard size automobiles (Fig. 1).
5. The levee should be low and wide to reduce erosion damage from flood waters overtopping.

6. A properly designed emergency spillway should be incorporated into or adjacent to the levee.
7. After construction, the levee should be planted with a perennial grass to control erosion, such as common bermuda or centipide grass.

Water Control Structure

Structures in the levee are needed to:
1. Capture rainfall run-off.
2. Control water depth.
3. Release water in February and allow normal drainage to occur without any long term (1+ weeks) flooding from March - September.
4. Completely drain the GTR within one week.

Common water control structures used are screw-gates or flash-board risers on metal culverts, and drop-logs on a concrete structure (Fig. 2).

Maintenance

Dikes should be mowed periodically to suppress undesirable weeds and woody growth.

Each fall and spring, water control structures need to be inspected to determine if they are functioning properly. In addition, they need to be cleared of debris when draining the GTR in February, and must be inspected for blockage following 1+ inch rains during the growing season.

Beavers, muskrats and nutria can cause damage by tunneling into levees and by plugging water control structures. These rodents can be controlled by following directions in the Texas Agricultural Extension Service. Bulletin 1556; "Identifying and managing aquatic rodents in Texas: beaver, nutria and muskrats."

Management

Flooding Schedule. Green-tree reservoirs should be flooded in October and drained during February. Care must be taken not to hold flood waters longer because trees may be killed or overly stressed. If you are managing more than one site, leave at least one GTR dry each year on a rotating basis so that all GTRs occasionally will be dry during winter.

Timber Management. Timber management can improve the site's value for ducks by adjusting the species composition and density of the trees present. Timber management should be conducted to provide an abundant and diverse mast crop each year. Preferred mast trees are cherrybark oak, laurel oak, Nuttall oak, water oak and willow oak. Other good mast trees include baldcypress, blackgum, common buttonbush, hackberry, honey locust, water locust, overcup oak, swamp chestnut oak, sweet pecan, water tupelo, ash, elm, maple and sweetgum. Ash, elm and maple are not good mast producers in the fall, but their winged seeds are valuable and are consumed by ducks during late winter when other mast are scarce.

Timber management can be conducted by selectively harvesting or killing single trees or groups of trees (1/4 – 5 acres). In commercial forest zones, this might be accomplished by conducting timber sales at 10-15 year intervals. Otherwise, felling of trees by hand tools (axe, chain-saw, etc.), or killing trees by girdling or injecting herbicides might be undertaken. Selective firewood cutting is another means of creating openings or thinning stands. Timber management should be conducted to:
1. Optimize mast production; maintain about 80 square feet basal area (BA) of desirable species. This will allow adequate space for trees to develop large crowns

and produce abundant mast. Of this 80 square feet BA, preferred species should occupy from 40-60 square feet.

2. Maintain a variety of mast producers because no single species will produce suitable quantities of mast every year.
3. Remove or kill low value trees to make room for better mast producers. Remove or kill stunted trees of all species that show no sign of mast production. A few standing dead trees are desirable nest sites of wood ducks and other cavity nesting wildlife.
4. Obtain optimum mast production from trees with d.b.h. (diameter of a tree at 4.5 feet above the ground) of 14-30 inches. Optimum mast production can be sustained by maintaining a good supply of middle age and younger trees in the stand. Healthy forest stands in GTR location should have an even distribution of desirable mast producers from seedlings through middle age pole timber to older saw timber.
5. Create or retain large den trees and snags that might be suitable for nesting by wood ducks and other wildlife.

In addition, cattle grazing should be eliminated or controlled to prevent damage to hardwood regeneration. GTR sites should be protected from fire.

Openings. Natural openings or artificially maintained openings (1/2+ acres in size) can provide diversity and produce additional foods, and provide a different setting for hunting.

Hunting over plantings of small grain crops in the openings are legal only if normal agricultural practices are conducted in their planting and harvest. If normal procedures are not followed, hunting is not legal.

For openings that remain moist or wet most of the year, native wetland plants can produce desirable duck food. Some sites may be suitable for planting Japanese millet in mid to late July. Best results with Japanese millet plantings are obtained by disking and fertilizing seedbeds. Broadcast seeding at rates of 10-15 pounds per acre are recommended. Light harrowing may be necessary to cover seed.

Openings that are high and remain dry most of the spring and summer (and are not needed for tree reproduction), should be planted to small grains. Some suitable species are corn, browntop millet, Japanese millet, pearl millet, proso millet and soybean. A soil test should be conducted to determine liming and fertilization rates, and an opening of at least 2 acres is needed for high grain production.

Hunting. Half-day morning hunts should be conducted no more than 2-3 days per week to prevent scaring ducks away from the site.

Wetlands and the Law

The U.S. Army Corps of Engineers and the Texas Water Commission regulate the discharge of dredge or fill material in wetlands, and the retention of public water for private use, respectively. Before constructing a GTR, they must be contacted to find out about existing regulations.

Assistance

Assistance in developing plans for Green-Tree Reservoirs and other wildlife management activities can be obtained by contacting the Parks and Wildlife Department, Wildlife Division, 4200 Smith School Road, Austin, Texas 78744; 1-800-792-1112, Attn: Technical Guidance.

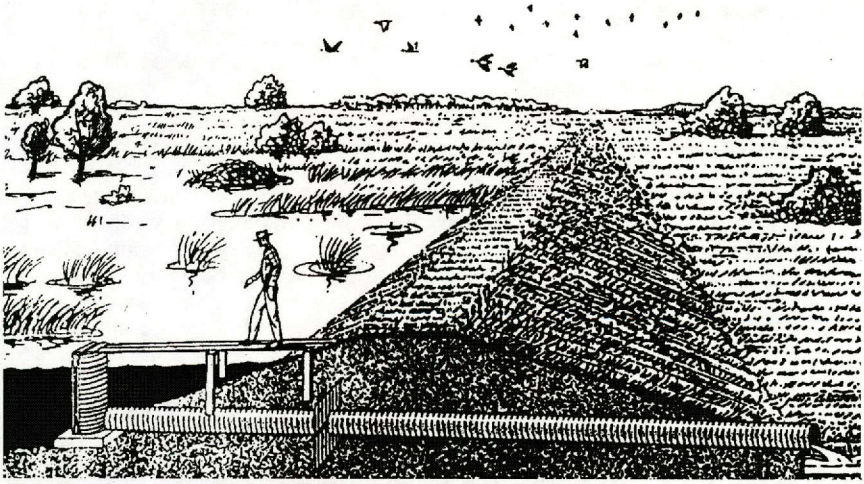

Fig. 1. A low-profile design will provide a durable and easy to manage levee for holding water in the green-tree reservoir.

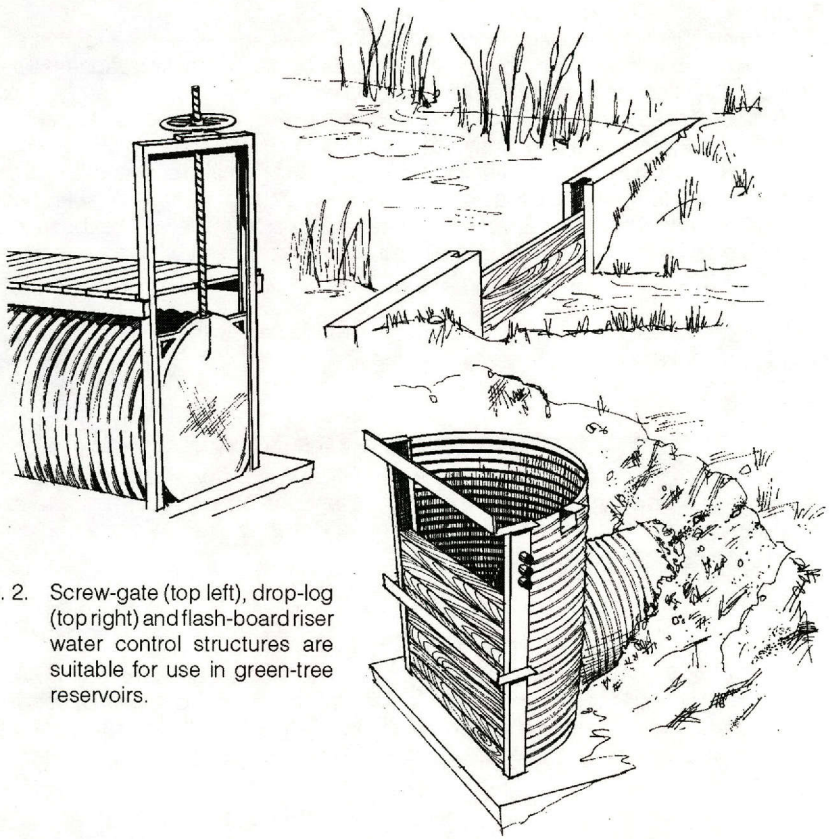

Fig. 2. Screw-gate (top left), drop-log (top right) and flash-board riser water control structures are suitable for use in green-tree reservoirs.

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