CONSTRUCTION AND PLACEMENT OF CYLINDER NESTING STRUCTURES FOR PUDDLE DUCKS

Mr. Sonny Knowlton
NYS Bureau of Wildlife
Alabama, NY 14003

Mr. Kenneth R. Zolnowski
Finger Lakes and Western New York Waterfowl Association
Cheektowaga, NY 14225

ABSTRACT

In recent years, increasing populations of fur-bearing predators, such as raccoons, have caused serious nest predation losses to ground nesting waterfowl, such as mallards. Additionally, avian predation by hawks and great-horned owls has been responsible for hen losses during nesting.

Cornell University studies have estimated that natural mallard nest success rates are quite low, varying between 1% and 28%, depending on location and habitat type. These developments have prompted examination of new types of artificial nesting structures to thwart predators, and boost production by ground-nesting waterfowl in areas where nest success is generally poor.

This report documents construction details for a cylindrical artificial nesting structure based somewhat on the Hen House design widely publicized by Delta Waterfowl. However, unlike the Delta design, this structure is much cheaper to construct, can be assembled from readily available materials, is capable of using tripod support structures in addition to traditional pole-type supports, and requires no special assembly skills such as welding. **Based upon three (3) years of in-the-field testing, nesting cylinders have proven far superior to traditional nest basket designs, demonstrating much higher use and success rates.**

The Finger Lakes and Western New York Waterfowl Association (FL&WNYWA) is an organization of waterfowl hunters dedicated to habitat acquisition, maintenance, and improvement activities beneficial to the waterfowl resource. In 1991, FL&WNYWA began a project to construct, emplace, monitor, and refurbish a number of artificial nest structures on the Tonawanda, Oak Orchard, and High Tor Wildlife Management Areas (WMAs). Beginning in 1996, FL&WNYWA introduced the modified Hen House design described herein for field evaluation. NYS Bureau of Wildlife biologists began field evaluation in 1998.

This FL&WNYWA project has been dedicated to the memory of Fran Finnick, long-time FL&WNYWA treasurer, who passed away in 1990.

FOREWORD

This brief technical note was prepared in tribute to the pioneering work in artificial duck-nesting structures undertaken by the staff of the NYS Bureau of Wildlife, Alabama, NY. Special thanks to Mr. Dan Carroll and Mr. Sonny Knowlton for readily sharing their broad knowledge and wealth of experience with our membership. Their dedication to habitat management and enhancement activities, and waterfowl production in particular, serves as an inspiration to all waterfowl enthusiasts.

1.0 INTRODUCTION

Artificial mallard nesting structures are not new in concept, but the cylindrical structure described herein is unique in that it can be quickly and cheaply manufactured from readily available materials. Additionally, it has proven far superior to traditional nest basket designs, showing greatly increased use and success rates by mallard ducks. Also, because a cylinder nest offers overhead protection, it virtually eliminates hen losses to avian predators.

The FL&WNYWA cylinder nest design is based somewhat upon the Hen House plans widely publicized by Delta Waterfowl, and is adaptable to the tripod-based support structure originally conceived, developed, and tested by personnel of the NYS Bureau of Wildlife, Alabama, NY. However, the modified Hen House structure described herein is much easier to build and install than the heavier pole-based design utilized by Delta Waterfowl, and requires no welding skills.

NYSDEC biologists have found that positioning such a nesting structure over water and near some woody vegetation provides an attractive nesting location and increased protection from predators. Maximum use appears to occur when the structures are placed about two (2) feet above the water.

2.0 ASSEMBLY

Required construction materials are detailed in Table 1 below. Tripod support structures for the nesting cylinders are assembled in the following fashion. A hole is drilled in each of the three conduit legs, approximately 4" down from one end. Additional holes are drilled approximately 40 inches and 50 inches ***from the end***. The tripod legs are lashed together at the top by running a heavy (12 ga.) galvanized steel wire through all three pieces of conduit and twisting tight.

TABLE 1 - CONSTRUCTION MATERIALS: CYLINDRICAL NESTING STRUCTURES USING TRIPOD SUPPORT

MATERIALS	QUANTITY PER STRUCTURE
• 10 foot length of ½″ thin wall steel conduit (EMT)	3
• 7 ft. X 28 in. section of 16 ga. Plastic-coated galvanized steel fencing (Yard Guard or equivalent) with 2″x 4″ or 2″ x 3″ grid size	1
• 8″– 10″ lengths of medium/heavy gauge galvanized steel wire	As needed
• 7″- 8″ plastic cable ties	As needed
• Triangular piece of plastic/metallic fencing, 25″ per side	1
• Hay for nest material	As needed

The nesting cylinders are constructed from a 7 ft. X 28 in. wide section of 16 ga. plastic-coated galvanized steel fencing with a 2″ x 4″ or 2″ x 3″ grid size (Yard Guard or equivalent). See Figure 1a. Field experience revealed that the 28-inch cylinder length (reduced from the Delta design length of 36″) was less susceptible to wind loading due to the smaller presented surface area.

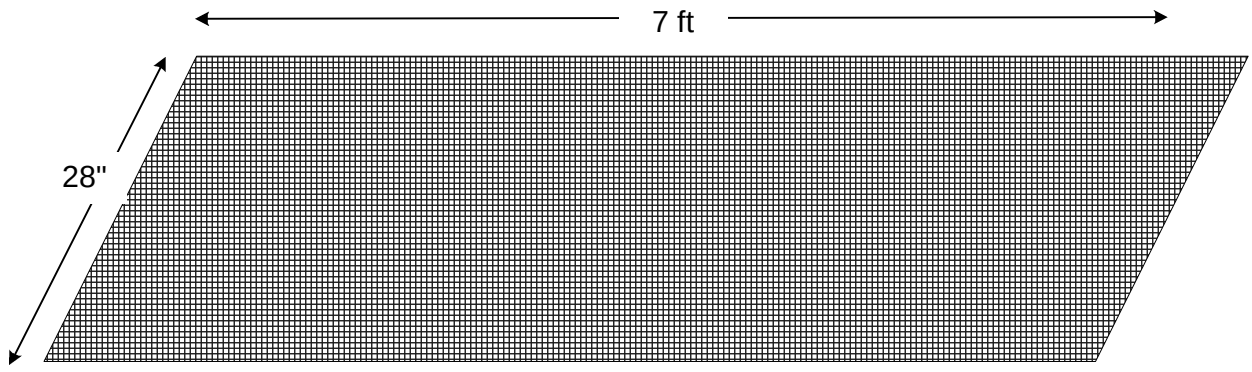

Figure 1a - Fencing Dimensions for Nesting Cylinder Construction

The procedure for assembling the cylinders is as follows. Using a 7 ft. x 28″ section of fencing, begin rolling fence into a cylinder shape using the first 3 ft. of fence, and secure with several cable ties. **This will result in a cylinder diameter of ~ 12 inches**. Next, cover the remaining 4 ft. x 28″ section with hay, spreading it evenly and generously over the surface to a depth of about 4

inches. (Sufficient thickness of hay is very important). Next, continue rolling the fencing **as tightly as possible**, and secure again with several cable ties. See Figure 1b.

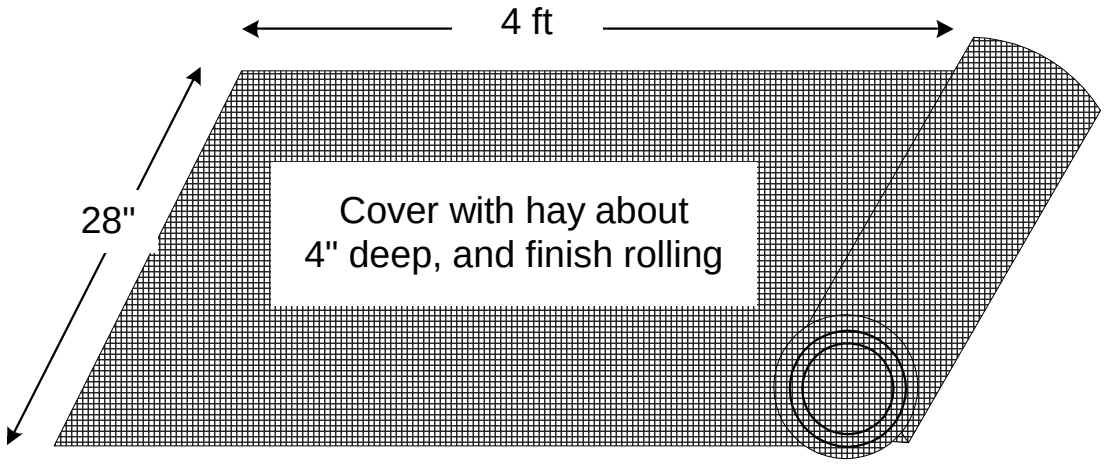

Figure 1b - Sandwiching Hay Between the Walls of the Nesting Cylinder

In order to help secure the cylinder to the tripod support, and to act as a safety net should connecting wires/cable ties come loose, a triangular floor is used. Flooring material can be flexible plastic snow fencing or the more rigid hardware cloth. The floor is in the shape of an equilateral triangle that is 25 inches on a side. A template made from cardboard/plywood can be used to trace the required shape onto the material. See Figure 1c.

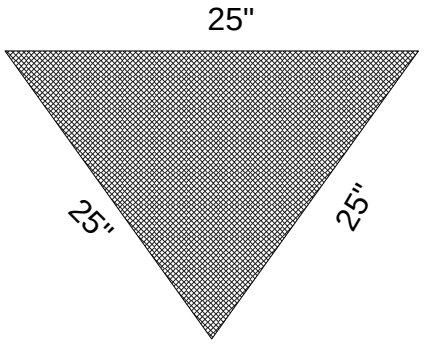

Figure 1c - Nest Cylinder Floor Dimensions

After construction, cylinders and floors are left detached from the tripod supports to facilitate transportation to the installation point when boats/canoes are involved.

3.0 FIELD ASSEMBLY

Initially, the tripod support is opened up and placed in the water so that **the triangular floor can be attached to the lowest set of holes using galvanized steel wire.** Although heavy gauge steel wire is preferred, we have also used the separate insulated conductors in odd lengths of non-metallic sheathed electrical cable (ROMEX) for this purpose. The plastic insulation is useful in preventing corrosion caused when two dissimilar metals are joined (e.g., copper with steel). The floor is attached by running a length of wire through each conduit leg and the floor grid at each apex of the triangle, and twisting the wire back upon itself.

To install the tripod structure in the marsh, the following procedure is used. First a single leg is pulled down to anchor it in the marsh bottom. Next, the remaining two legs are stretched apart to unfurl the floor, and are similarly anchored into the marsh bottom. A cylinder is then placed horizontally onto the floor such that it is **broadside to the prevailing wind direction** (generally, this is out of the SW here in NYS during the nesting season; hence, the cylinder would be oriented NW x SE.) This orientation is necessary to limit the possibility that strong winds will tunnel through the open ends of the cylinder, creating an uncomfortable nesting environment**.** Next, 12 ga. galvanized wire is used to attach the cylinder to each of the three legs by threading it through the leg and the cylinder's grid, and twisting the wire back upon itself. **Recently, we have augmented this attachment with the use of 8" plastic cable ties.** These are threaded through the cylinder grid and around each leg just above and below the wire connection described above. The cable tie is pulled as tight as possible to ensure the cylinder is locked securely to the tripod leg support. Cable ties are also used to attach the cylinder to the floor piece. See Figure 1d.

Marker tags can be added to each tripod to identify the builder, the date, and the tripod number. This is especially useful for clubs planning to emplace and monitor a large number of nesting structures. These markers can simply be 1/2" x 3" aluminum strips commonly referred to as "trapper tags", which are readily available through mail order (F. Lynch & Co., RD#1, Box 696, Jermyn, PA 18433).

Some hay is added inside the cylinder for nesting material only after the structure is installed in the marsh. Hay should be applied liberally and will need to be replaced yearly, or the structures will not be attractive to potential nesters. Also, strong winter winds may blow hay out of the sides of the cylinder during the off-season. This hay can easily be replaced in the spring by pushing fresh hay between the walls of the cylinder either with a gloved hand or with the aid of a piece of wood or plastic. **To limit hay loss, try using several cable ties on each end of the cylinder to clamp the walls down tightly on the enclosed hay**.

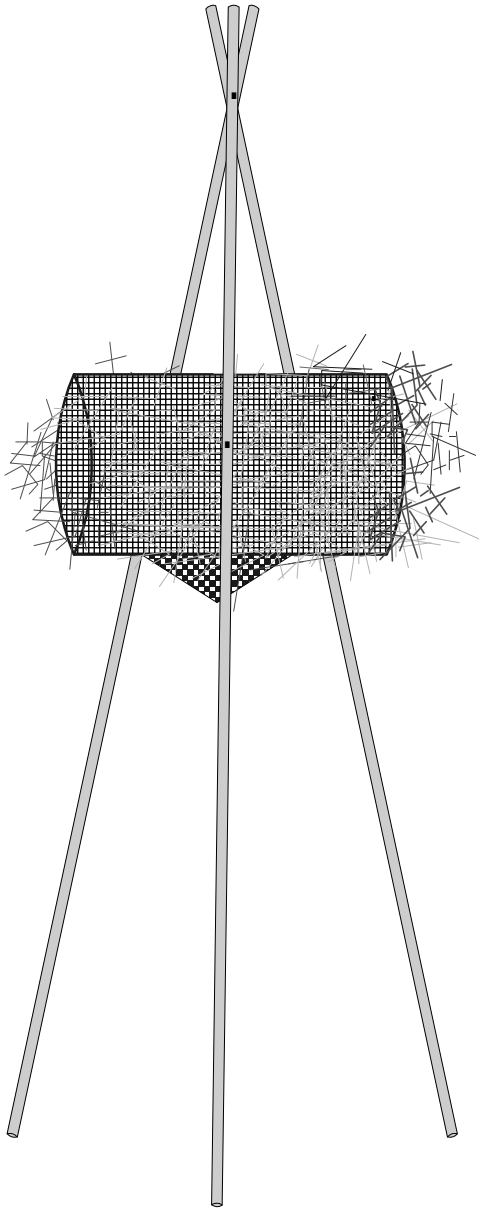

Figure 1d TRIPOD-BASED CYLINDRICAL NEST STRUCTURE

4.0 NEST STRUCTURE PLACEMENT

Placement of finished structures in the marsh requires attention to several simple guidelines. If possible, place structures on the edge of marshes or in open pockets of water surrounded by vegetation. Water depth should be in the one and one-half (1-1/2) to three (3) foot range. Structures must be anchored well, to prevent toppling during strong winds. Spacing between structures depends somewhat on the size of the wetland area. Typical spacings at Tonawanda WMA are in the 100-yd. range. On smaller water bodies, even 20-yd. spacings may work fine.

Builders should ensure that nest structures are in place, and filled with hay, early in the breeding season. In Western New York, this is late March or early April.

5.0 MONITORING NEST STRUCTURES

Once emplaced, structures should be checked at two to four-week intervals to determine utilization and hatch success. When monitoring nesting progress, be aware of these facts. The mallard hen initially constructs a nest-bowl in the hay before egg laying begins. The bowl will be 8 to 10 inches across, several inches deep, and will be perfectly smooth. Eggs will be laid (one per day) until a total clutch of 8 to 13 eggs is achieved. The hen will usually leave the tripod for long periods during the egg-laying stage. However, once she begins incubating the clutch, she will spend only minimal time away from the nest. Incubation will last between 24 and 28 days. Generally, all eggs within a nest will hatch within a few hours time, and the hen will soon lead her brood away from the tripod in search of food and cover.

When checking nests, approach cautiously, but not too quietly, to ensure that the hen is not startled. Use binoculars to determine if a hen is nesting, and avoid disturbing her. If flushed, however, experience has shown that she will generally return.

After a hatch, the number of hatched ducklings can be estimated by counting the membranes left behind in the nest. Membranes are off-white in color, and are flexible like rubber or latex. Membranes may be buried deep in the nest material, so be sure to check the nest carefully. Spiral-bound 3x5 cards are perfect for recording monitoring activities.

When first emplaced, cylinder utilization may be low. However, experience and field studies have shown that adult and juvenile birds "imprint" on the structure––that is, adults will re-utilize such structures again in future years, and juvenile hens who successfully hatched from cylinders will use them when they reach adulthood.

6.0 USE AND SUCCESS RATES

Since 1991, FL&WNYWA has installed over 180 basket or cylinder tripod-based structures on the Tonawanda and Oak Orchard Wildlife Management Areas, and the Iroquois National Wildlife Refuge. Over the past three years, we have begun installation of the cylinder nest structure design described in this report, and have found that cylinder use and success rates are much higher, compared to the basket structures used initially. FL&WNYWA nest basket and nest cylinder results for 1997 and 1998 are summarized in Table 2. As shown in Figure 1e, use rates are nearly twice as great with cylinders, and the cylinder nest success rate is nearly 100%.

Table 2 NEST USE AND SUCCESS RATES-FL&WNYWA, 1997 AND 1998

	1997		1998	
	BASKETS	CYLINDERS	BASKETS	CYLINDERS
Number	57	18	66	35
Number Used	33	14	27	27
Use Rate	58%	78%	41%	77%
Number Hatched	31	13	21	27
Success Rate	94%	93%	78%	100%

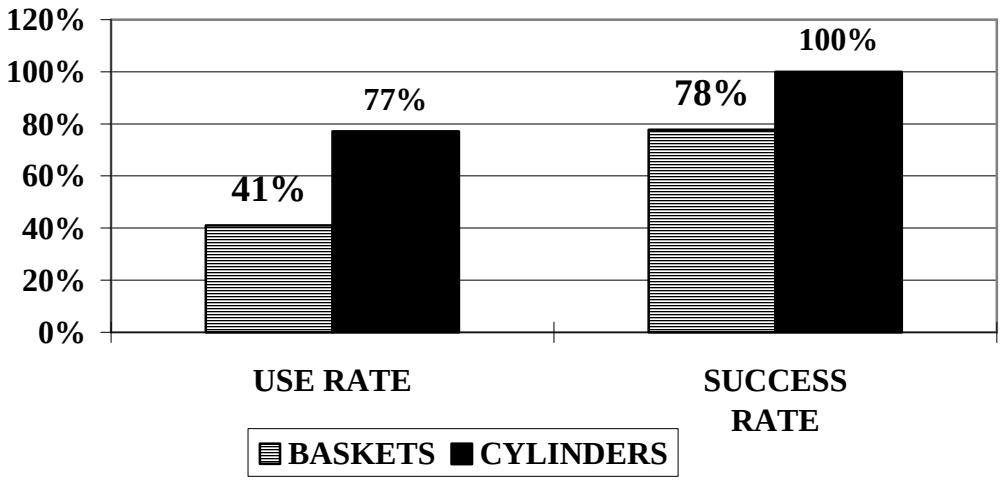

Figure 1e USE AND SUCCESS RATES FOR BASKET AND CYLINDER NEST STRUCTURES, TWMA - 1998

Additional details on this subject can be obtained from:

1. NYS Bureau of Wildlife
   P.O. Box 422
   Alabama, NY 14003
2. Finger Lakes & Western New York Waterfowl Association
   46 Puritan Place
   Orchard Park, NY 14127

Also, you are encouraged to inform these organizations of other ingenious materials for artificial nest construction, or to convey your "lessons learned". Your thoughts and comments are welcome!

Whatever your interest in waterfowl, don't just read this report--get involved! More nest sites mean more ducks for everyone to enjoy. Besides, it's also a perfect project for kids--get schools and scout troops in the act! The North American Waterfowl Management Plan speaks of the need for direct public involvement in conserving our waterfowl resource, and here's your chance to do just that. Put some nesting structures on your favorite marsh, pond, or pothole. It's a rewarding experience you won't soon forget.