Making a High-Net System for Catching Bats

By Tim Carter – Ball State University © 2008

These are instructions for making a net set similar to those described in the Indiana bat recovery plan. This design will work with three nets stacked and reach approximately 30ft high (triple set). These instruction also include how to use this equipment to work with two nets stacked and reaching approximately 20ft high (double set). Erecting these nets requires a minimum of two people. The 30ft set is especially difficult and 3-4 people make it much easier – especially until you get some practice at the process.

There are two basic systems for high nets. One system uses large stakes hammered into the ground and the poles are placed over the top of them. This stake system is relatively quick to deploy and requires less ropes and equipment. Some people including myself are not fond of this system because the nets often have considerable sag in them. The system described here does not use large stakes but rather a system of ropes to support the poles. With this guide rope system the poles are less "wobbly" and the nets are held much tighter between the poles. With practice this guide rope system can be erected in the field at about 1 minute per foot (20 min – 20 ft set; 30 min – 30ft set) and be taken down at about 30 seconds per foot. Both the guide rope and the stake systems have been effective at catching bats and it often comes down to personal preference.

PARTS (quantity)

Poles – 10ft steel poles (6). These need to fit into each other with a male and female ends. Antenna poles found at hardware and home improvement stores are most often used. Poles come in different thickness and lengths. Heavier gauge poles are stronger, but obviously weigh more. Also be cautious many manufactures are making poles shorter to reduce costs (e.g. 9ft poles). Top rail poles for chain-link fencing may be used; however the male end is shorter and results in a less stable connection. Also these poles are longer than 10ft and will require trimming to work with these instructions or all measurements below can be adjusted for longer (or shorter) poles.

Ropes

- Pulley – Braided Nylon 1/4 – 75ft (2)
- Guides – Braided Nylon 1/4 – 100+ft (2)
- Top – Braided Nylon 1/8 – 75 ft (1)

Hardware (Brass is better as it does not rust and stainless steel is VERY expensive)

- Eye bolts ¼ in x 2in (6) (figure 1)
- Nylon lock nuts ¼in (6) (figure 1)
- Trigger snap – guide ropes (2) (eyebolt snaps also work; figure 1)
- Eyebolt snap (4) (like those found at end of dog leash; figure 1)
- Pulleys 5/16 – Swivel base are best (4) (figure 1)
- Quick links 1/8 (2) (figure 1)
- Steel rings - 1 inch (2) (figure 5)
- Spring links – top of poles (3) (figure 1)
- 8+ shower curtain rings (metal with rollers – see figure 6)
- Set of sturdy camping stakes and mallet

Tools:

Tape measure
Drill and drill bits
Wrenches and/or socket set
Knife and lighter (to melt ends of rope to prevent fraying)

Construction:

Note: these instructions are for a "triple" set (30ft tall with three nets). This same equipment can be used for a "double" set (20ft tall with two nets) with minimal additional equipment (additional Pulley ropes). To run a triple set use a top and bottom pole with an additional pole (blank with no added hardware) in the middle. To run double set use only the top and bottom poles.

Top Pole:

Drill two ¼ inch holes through the top of the pole. Mount eyebolts through holes one from each side with the Nylon lock nuts (see figure 1). Attach a spring link to the upper eyebolt (see figure 2). This spring link should always be stored on this eyebolt.

Bottom Pole:

About 1 foot from the bottom, drill a ¼ inch hole through the pole. You should try and line it up so the hole is in-line with the holes in the top pole when assembled. Mount an eyebolt so the "eye" is on the same side as the top eyebolt on the top pole (see figure 3).

Guide Rope:

Take 100+ft rope and attached a swivel trigger snap to the middle (see figure 1).

Pulley Rope:

Assemble the top pulley using a quick link to attach the eye bolt snap to the pulley (see figure 1). On the bottom attach the pulley to an approx 5ft piece of rope. Tie a loop just below the pulley in the rope (see figure 3).

Run the 75 ft rope through the top and bottom pulley to make the loop (see figure 1 & 3). Place the pulleys in their approximate locations (figure 2 & 3) to determine the correct length of pulley rope. Where the ropes meet, tie the upper rope to the steel loop. Tie a eyebolt snap on the lower rope and store two-three feet of extra rope by tying a series of knots in the rope below the eyebolt snap (see figure 4). This extra rope can be let out later if the pulley rope shrinks. A set of pulley ropes will need to be made separately for a "triple" set and "double" set. I recommend color coding each set with paint for easy identification in the field.

Top Rope:

Tie a spring link to one end of the top rope (see figure 1).

Field Setup:

Note: It is strongly suggested that you practice setting up this system during the day light in a convenient area (e.g. open field). Be careful of overhead hazards when dealing with 20ft and 30ft poles! Also consider what poles will hit if they fall during a failed setup attempt!

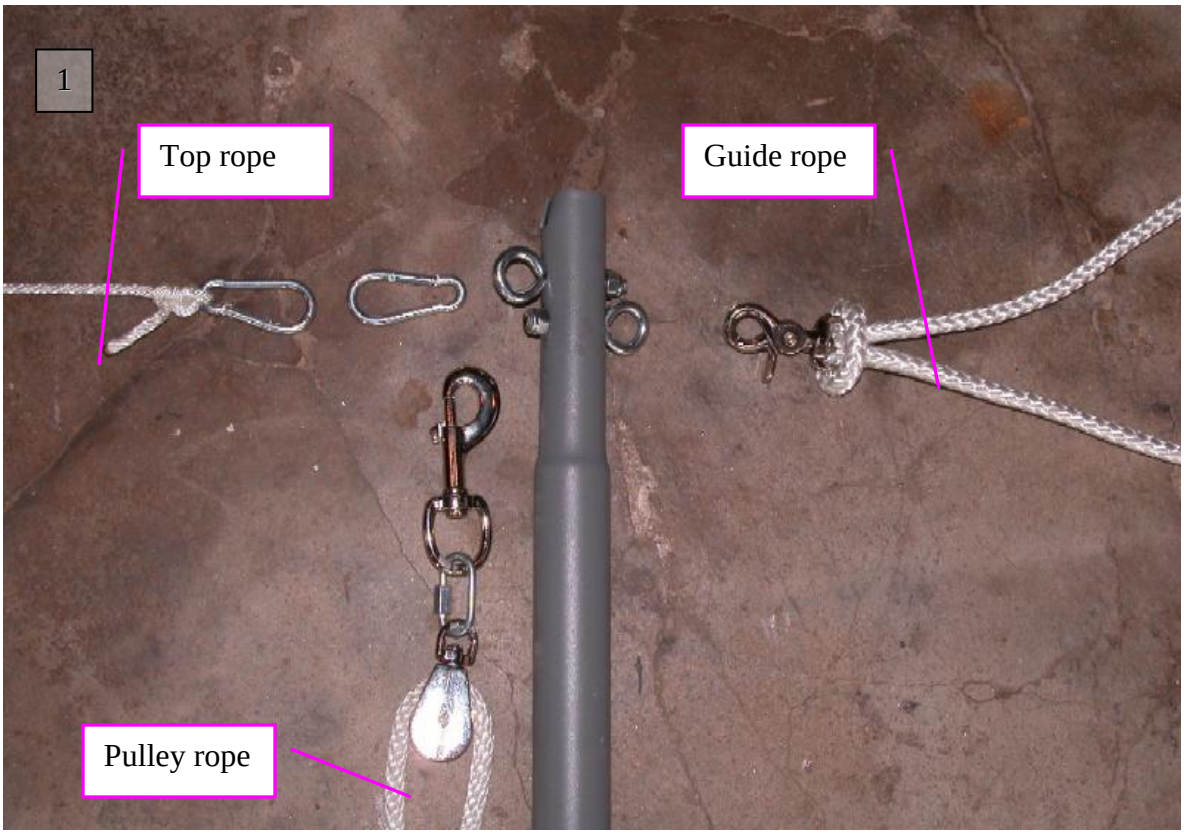
1. Assemble poles using top and bottom only for a 20ft set or including a blank center pole for a 30ft set.
2. Attach the top clip of pulley rope to upper eyebolt (figure 2). Attach the bottom of pulley rope to bottom eyebolt by sliding the end of the rope through the eyebolt and back up through the loop in the rope (figure 3). Pull down on the rope to tighten, tie knot to secure. The pulley rope should be snug without being overly tight.
3. Attach the guide rope to the lower eyebolt at the top of the pole (figure 2). Unwind the guide ropes to prevent tangling.
4. Top rope should be clipped to spring link on top of one pole (figure 1). The rope should run through the spring link at the top of the second pole (figure 2) and run down to the base. Temporarily tie off the end of the top line to the bottom eyebolt. Take care to run the rope through the spring link without looping as this will cause too much friction and will prevent adjustability later (figure 2).
5. Poles should be ready to be erected. Determine location where poles will be placed. The poles should be placed apart about the length of the net plus ¼ meter (25 cm). Use a tape measure to accurately determine distance and mark locations on ground.
6. Raise one of the poles in place. Note: 30ft poles are very challenging and require one person to hold the base in place as a second person "walks" the pole up. Twenty-foot poles can be raised by one person. As one person hold the poles to prevent falling. The other person should tie off the guide ropes at 45 degree angles from the parallel plain of the net to any solid object or to camping stakes if needed. The ropes should be tight enough that the top of the pole will not move toward the other pole. Slip knots like a "double half-hitch" work especially well since they can be easily adjusted later to fine tune the set up.
7. To prevent this pole from falling, either a third person is needed to hold it while the other people set up the second pole or you can carefully lean this pole against a tree (if available) or you can try and kick the base of the pole back toward the tie off points about 3-6 feet. The pole should then lean forward and be supported by the two ropes that were just tied off (like a leaning tripod - takes some practice).
8. Erect the second pole in a similar manner to the first. Once the all the guide ropes are securely tied off you can pull down on the end of the top rope. This will connect the top of the two poles and complete the support system. Make sure the bottoms of both poles are in the correct locations. Adjust the top and guide ropes as needed to ensure the two poles are perfectly straight up and down in all directions. Secure the end of the top rope to the bottom eyebolt.
9. Place the nets on the pulley ropes. To do this, first get the trammel loops of the net in the correct order. Carefully unclip the eyebolt snap from the steel ring – DO NOT let go of the steel ring. If the steel ring gets out of reach you will have to drop the net poles to

retrieve it!!! Slide the rope through the trammel line loops and re-secure the eyebolt snap to the steel ring. Walk the net over to the other pole – do not let the net touch the ground (you know why!!).

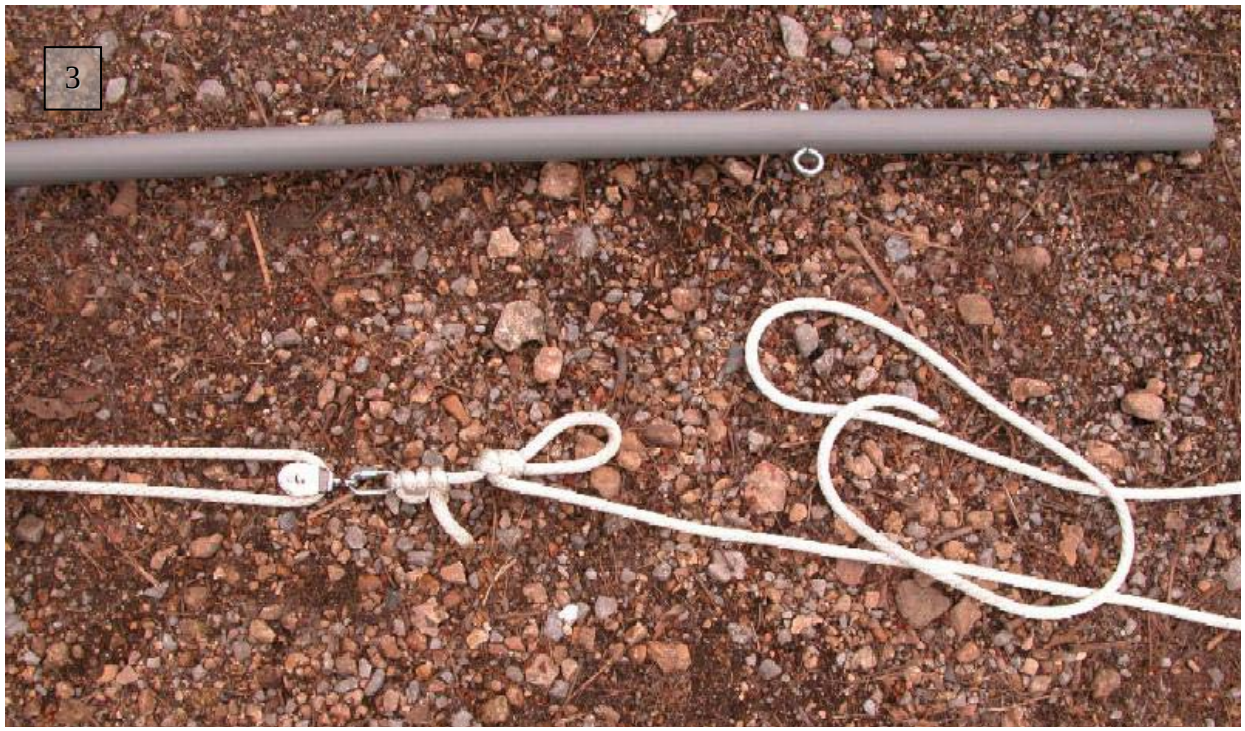
10. Ensure that the net is not twisted and secure the net to the other pole in the same manner.
11. Repeat with the next net until the desired number of nets is installed.
12. Place the top trammel loop of the upper net above the steel ring and the rest below. Use two shower-curtain rings to secure the steel loop to the pole (figure 6).
13. Raise the net by pulling down on the pulley rope not through the trammel lines. This will raise the net like a flag on a flagpole. To close the gap between two nets use some thin cotton twine to tie the bottom of the upper net to the top of the lower net. Do not pull these knots tight as it makes them difficult to remove later.
14. Important Note: Do not raise or lower the net more than about 10 feet per side at a time. Lowering or raising one side to far will stretch the net and cause either damage to the net or equipment (often the shower curtain rings). You must raise and lower the two sides in unison or side-to-side in increments.
15. Add a shower-curtain ring about every 6ft to hold the rope tight against the pole (figure 6)
16. Once the net is raised you may want to adjust the guide ropes and top rope to move the poles in or out as needed to make the net more or less taught.
17. To lower the net simply raise the bottom of the net with your hand. Grasp the pulley rope below the lowest trammel and pull down on the rope. Do this repeatedly until the net is lowered as needed.

Field Take-down:

Reverse the steps above. Be careful as gravity may speed up the process more than you may like!


1
Top rope
Guide rope
Pulley rope


2


3


4


5


6

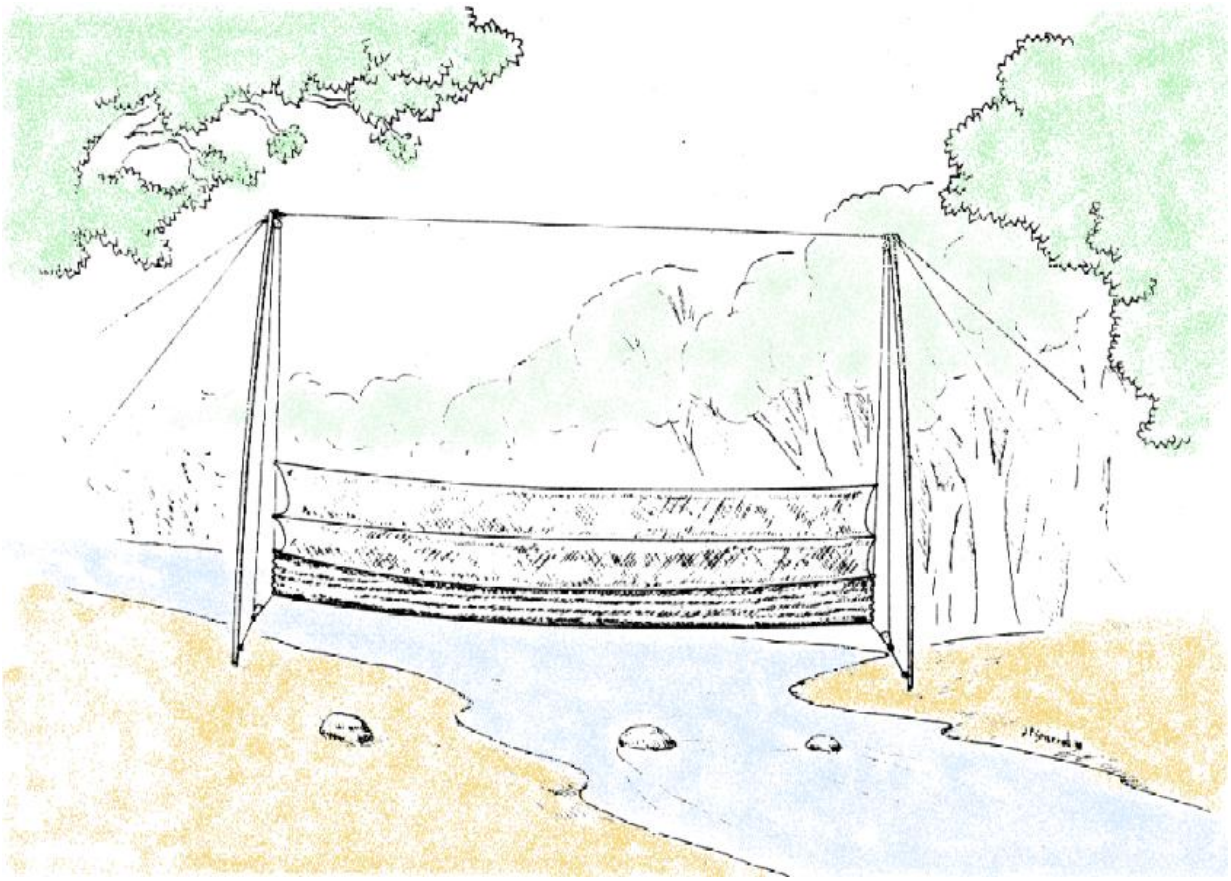


Figure from: Gardner, J. E., J. D. Garner, and J. E. Hofmann. 1989. A portable mist netting system for capturing bats with emphasis on *Myotis sodalis* (Indiana bat). Bat Research News 30:1-8.