



NFAA[®]
Archery and Bowhunter
Range Guidelines

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INTRODUCTION

In 1991, as part of a nationwide program to develop new and more places for bowhunters and recreational archers to learn, practice and demonstrate their skills, the **American Archery Council (AAC)**, under principal sponsorship of the **Archery Manufacturers and Merchants Organization (AMO)**, began providing some basic guidelines for the acquisition and development of archery and bowhunter ranges. The fourth and most popular booklet in the series was *Archery and Bowhunter Ranges Guidelines*, revised most recently in 1995, and now out of print. The fifth booklet, *Cost Sharing the Development of Archery Ranges*, revised most recently in 1994, was published by the AMO as a comprehensive guide to sources of financial and advisory assistance. Although still somewhat useful, the guidelines listed in both booklets are out of date.

The original *Archery and Bowhunter Ranges Guidelines* defined range, target butt, and safety design criteria for virtually every indoor and outdoor archery game offered by the major, competition-oriented, archery and bowhunter organizations in the United States. The amount of detail describing the games in this document is substantially reduced, and is limited to summaries of those games sanctioned by the **National Field Archery Association (NFAA)** in the USA, and to subtle variations of these games sanctioned worldwide by the **International Field Archery Association (IFAA)**. The range design criteria presented, however, are little different from that published in the original *Archery and Bowhunter Range Guidelines*.

Section I leads off with a cursory description of almost all outdoor archery games defined by the NFAA and IFAA. These games come in three versions: *Field Archery*, *Target Archery* and *Bowhunter Rounds*. **Section II** then attempts to define basic lay-out design criteria for each version. **Section III** follows with outdoor target butt and backstop construction, including some do-it-yourself ideas, while **Section IV** lists several "Don't Forget" items and equipment needed to make a successful field, target and bowhunter range. **Section V** is a comprehensive list of outdoor range safety issues, which, in the final assessment, determines whether your range is GO or NO-GO for hosting competitive events.

Section VI summarizes the most popular NFAA/IFAA indoor archery games. Then, based on the fact that nearly all indoor archery games are shot at 20 yards, minimum dimensions (length, width and height) for an indoor range are recommended in **Section VII**. Requirements and suggestions related to indoor target butts, backstops, lighting, peripheral equipment, and safety are outlined in **Section VIII** and **Section IX**. Finally, in **Section X**, and as an addendum to the original *Guidelines*, a few design guidelines for making ranges wheelchair accessible are outlined.

These guidelines contain very little original material. All target and round descriptions are merely summaries of official rules and regulations documented in the NFAA *Constitution and By-Laws* and the IFAA *Book of Rules*. Specific shooting and scoring rules are not delineated herein. Furthermore, these guidelines do not address any aspects of commercial archery range development; such as, design specifications, drawings, financing, construction, insurance and retail management. To be more emphatic:

**THE GUIDELINES HEREIN ARE NOT INTENDED TO BE STAND ALONE.
NO ATTEMPT SHOULD BE MADE TO SET UP A RANGE OR COMPETITIVE
ARCHERY PROGRAM WITHOUT CONTACTING AND/OR JOINING THE
NFAA NATIONAL ORGANIZATION**

**SECTION I
SUMMARY OF OUTDOOR ARCHERY GAMES**

I.A. Field Archery

Field archery is a roving archery game in which successive targets are shot at varying distances. The game was created as a practice round for bowhunters, but was soon standardized as a competitive round for any archer to enjoy. In a way, field archery is analogous to golf, as is sporting clays analogous to field archery; that is, each "target" is different, and you move from "hole-to-hole."

I.A.1. NFAA/IFAA Field Round

I.A.1.a. Standard Unit. A standard unit consists of four shots each at 14 different targets. The 14 targets are (not in any order):

- ◆ 15, 20, 25 and 30 yards at a 35-cm face (4 total).
- ◆ 40, 45 and 50 yards at a 50-cm face (3 total).
- ◆ 55, 60 and 65 yards at a 65-cm face (3 total).
- ◆ 35-yd, 4-position "fan" at a 50-cm face (1 total).
- ◆ 4-position "walk-ups" (3 total):
 - ◆ 35-30-25-20 feet at a 20-cm face.
 - ◆ 45-40-35-30 yards at a 50-cm face.
 - ◆ 80-70-60-50 yards at a 65-cm face.

The foregoing distances are for adults. NFAA youth (or IFAA juniors) and cubs shoot at reduced distances in all outdoor archery games. See the NFAA *Constitution and By-Laws* and the IFAA *Book of Rules*.

I.A.1.b. Targets. Four target sizes shall be used. The outer ring diameter shall be 65 cm, 50 cm, 35 cm, and 20 cm. The spot shall be two black rings (with white X in the center ring), two white middle rings, and two outside black rings. The X-ring is used for tiebreakers only. The rings have the following diameters:

| Target Diameter | 65 cm | 50 cm | 35 cm | 20 cm |
|--------------------------|--------------|--------------|--------------|--------------|
| Outer outside black ring | 65 cm | 50 cm | 35 cm | 20 cm |
| Inner outside black ring | 52 cm | 40 cm | 28 cm | 16 cm |
| Inner outside black ring | 39 cm | 30 cm | 21 cm | 12 cm |
| Inner middle white ring | 26 cm | 20 cm | 14 cm | 8 cm |
| Black center spot | 13 cm | 10 cm | 7 cm | 4 cm |
| X-ring | 6.5 cm | 5 cm | 3.5 cm | 2 cm |

The scoring is 5 points for the center spot, including the X-ring; 4 for the two white rings; and 3 for the outside black rings

To minimize glance-outs and arrow damage, multiple target faces may be used at all distances, but are generally used only at the shorter distances. For example, the minimums are:

- ◆ Sixteen (NFAA) or eight (IFAA) 20-cm faces per butt.
- ◆ Four (NFAA) or two side-by-side (IFAA) 35-cm faces per butt.
- ◆ Two side-by-side (NFAA only) 50-cm faces per butt.

I.A.1.c. Summary of Shooting and Scoring Rules. Each archer shoots four arrows at each of the 14 targets. The order in which these targets are shot depends entirely on the range layout. For ten of the 14 targets, the archer shoots four arrows from a single stake at a single target face. For the remaining four targets, the archer shoots one arrow from each of four stakes at a single target.

As noted above, a perfect score is 5 per arrow, or 20 per target, or 280 per 14-target unit. A standard "round" is two 14-target units, with 560 points as perfect.

I.A.2. NFAA/IFAA Hunter Round

I.A.2.a. Standard Unit. As with the Field Round, a Hunter Round standard unit consists of four arrows each at 14 different targets:

- ◆ Single-position (4 total):
 - ◆ 40, 44, 48 yards at a 50-cm face.
 - ◆ 11 yards at a 20-cm face.
- ◆ 4-position walk-ups (4 total):
 - ◆ 53-48-44-41 yards at a 50-cm face.
 - ◆ 58-53-48-45 yards at a 65-cm face.
 - ◆ 64-59-55-52 yards at a 65-cm face.
 - ◆ 70-65-61-58 yards at a 65-cm face.
- ◆ 2-position walk-ups (3 total):
 - ◆ 23-20, 19-17, and 15-14 yards at a 35-cm face.
- ◆ 4-position fans (3 total):
 - ◆ 36 yards at a 50-cm face.
 - ◆ 28 and 32 yards at a 35-cm face.

I.A.2.b. Targets. The target has two white rings with black X in center ring, and two outside black rings. The X-ring is used for tie breakers only. The rings have the following diameters:

| Target Diameter | 65 cm | 50 cm | 35 cm | 20 cm |
|--------------------|--------|-------|--------|-------|
| Outside black ring | 65 cm | 50 cm | 35 cm | 20 cm |
| Middle black ring | 39 cm | 30 cm | 21 cm | 12 cm |
| White center spot | 13 cm | 10 cm | 7 cm | 4 cm |
| X-ring | 6.5 cm | 5 cm | 3.5 cm | 2 cm |

The scoring is 5 points for the center spot, including the X-ring; 4 for the middle black ring; and 3 for the outside black ring. Again, multiple target faces are used at the shorter distances. The NFAA and IFAA minimums are the same as noted for the Field Round.

I.A.2.c. Summary of Shooting and Scoring Rules. As with the Field Round and except for the 11-yd "birdie," four arrows are shot from a single stake at a single face for the one-position targets. For the 4-position walk-ups, one arrow is shot from each stake; for the two-position walk-ups, two arrows are shot from each stake at a single face; and for the 4-position fans, two arrows each are shot at the left and right faces. Shooting and scoring rules are the same for both the Hunter and Field Round. In fact, an official 28-target "Round" may consist of any combination of Field or Hunter 14-target units.

I.A.3. NFAA/IFAA Animal Round

I.A.3.a. Standard Unit. A standard unit for the Animal Round consists of a single "scored" shot at 14 different targets. A maximum of three arrows may be shot at each target, but only the arrow scoring the highest value is counted. The 14 targets consist of (see I.A.3.b. for target descriptions):

- ◆ Three, Group 1 targets at marked distances varying from 60 yards down to 40 yards.
- ◆ Three, Group 2 targets at marked distances varying from 45 yards down to 30 yards.
- ◆ Four, Group 3 targets at marked distances varying from 35 yards down to 20 yards.
- ◆ Four, Group 4 targets at marked distances varying from 20 yards down to 10 yards.

Group 1 and 2 targets are 3-position walk-ups, with the intervals generally 5 and 3 yards, respectively. Group 3 and 4 targets are single-position.

I.A.3.b. Targets. Each animal target has two scoring areas — a "vital" or "kill" zone, and a "non-vital" or "wound" zone. The higher scoring vital areas are oblong in shape and have the following "rough" dimensions (NFAA and IFAA slightly different) for each of the four Groups:

- ◆ Group 1: 9 x 14 inches. These targets include black bear, grizzly, moose, deer, caribou and elk.
- ◆ Group 2: 7 x 10 inches. These targets include small black bear, antelope, ram, small deer, mountain lion and wolf.
- ◆ Group 3: 4 x 7 inches. These targets include raccoon, javelina, wildcat, coyote, turkey, fox, goose and pheasant.
- ◆ Group 4: 2¼ x 3½ inches. These targets include duck, turtle, grouse, rock chuck, wood chuck, skunk, jack rabbit and crow.

The lower scoring, non-vital, scoring zones have identical areas in each group, but are shaped to fit the particular animal.

I.A.3.c. Summary of Shooting and Scoring Rules. A maximum of three, marked arrows may be shot, in order, at each target. For the Group 1 and 2 walk-ups, the first arrow is shot from the farthest stake, the second arrow from the middle stake, and the third arrow from the nearest stake. If the first arrow scores (either vital or non-vital), then there is no need to shoot the second arrow. If the first arrow misses, and the second arrow scores, then there is no need to shoot the third arrow. The third arrow is shot only if the first and second arrows are suspected misses. In no case can anyone walk up to a target, and then walk back to shoot a second or third arrow in the event of a missed shot. If you're not sure you scored, then always shoot the next arrow! For Group 3 and Group 4 single-position targets, the second and third shots, if needed, are shot from the same stake as the first shot.

The scoring is as follows:

- ◆ 1st arrow vital – 20 points.
- ◆ 1st arrow non-vital – 18 points.
- ◆ 2nd arrow vital – 16 points.
- ◆ 2nd arrow non-vital – 14 points.
- ◆ 3rd arrow vital – 12 points.
- ◆ 3rd arrow non-vital – 10 points.

As with the Field and Hunter Rounds, a perfect score for a 14-target Animal Round is 280 points.

I.B. Other Related Field Archery Games

I.B.1. NFAA 15-Target “300” Rounds

The “300” Round was created several years ago as way to eliminate the “dreaded 80 yarder” from the standard NFAA Field Round. The maximum shooting distance is reduced to 65 yards, thereby enticing bowhunters to try Field Archery. Also, even though there’s an extra (but short) target added, the 15-target “300” Round requires no more land for a range than for the 14-target Round.

I.B.1.a. “300” Field Round. This round is the same as the 14-target Field Round except that the 80-70-60-50 yard walk-up is replaced by a 65-60-55-50 yard walk-up, and a 30-25-20-15 yard walk-up is added.

I.B.1.b. “300” Hunter Round. This round is the same as the 14-target Hunter Round except that the 70-65-61-58 yard walk-up is replaced by a single-position, 58 yard target, and a 32-28-24-20 yard walk-up is added.

I.B.1.c. “300” Animal Round. This round is the same as the 14-target Animal Round except that a fifth Group 4 target is added.

I.B.2. NFAA/IFAA International Round

I.B.2.a. Standard Unit. A standard unit consists of three shots each at ten different targets ranging from 20 through 65 yards, in 5-yard increments. Also, NFAA youth (or IFAA juniors) and cubs shoot at reduced distances. As with the Field and Hunter Rounds, the targets don’t have to be shot in any particular order. In fact, the International Round is usually shot as a roving game on a field course by merely not using the 80-yd and 45-yd walk-ups, the 15-yd target, and the 35-ft walk-up. This round is also ideally suited for a target-type archery tournament in a typical public park setting (see Section I.C.). Here, the targets are usually shot in ascending order from 20 through 65 yards.

I.B.2.b. Targets. The International Round uses the same 35-cm, 50-cm and 65-cm black faces used in the NFAA/IFAA Hunter Round. The 35-cm face is shot at 20, 25 and 30 yards; the 50-cm face at 35 through 50 yards; and the 65-cm face at 55, 60 and 65 yards. Use of multiple target faces at the shorter distances is encouraged.

I.B.2.c. Summary of Shooting and Scoring Rules. Three arrows each are shot at the ten targets, yielding a perfect score of 150 for the standard unit. An International Round consists of two, 10-target units (either repeat of one, or two different) for a perfect score of 300.

I.C. Outdoor Target Archery

Target Archery includes any one of the classic archery games laid out on a relatively flat, treeless field or park-like area. The archers shoot simultaneously, and generally walk back to the “static” shooting line after each “end,” rather than moving on to the next target as in Field Archery. FITA (“Olympic style”) target archery games are not treated herein.

I.C.1. NFAA 900 Target Round

The 900 Round consists of 30 arrows each at 60, 50 and 40 yards using the standard 122-cm FITA face. There are five, 6-arrow ends at each distance, in descending order. Scoring is as follows: inner gold – 10, outer gold – 9, inner red – 8, outer red – 7, inner blue – 6, outer blue – 5, inner black – 4, outer black – 3, inner white – 2, and outer white – 1. Perfect score is (3 distances) x (30 arrows/distance) x (10) = 900.

I.C.2. American Round or NFAA 810 Round

This round is the same as the 900 Round except that only the five “colors” are scored. That is 9 for gold, 7 for red, 5 for blue, 3 for black and 1 for the white ring. Perfect score is (3 distances) x (30 arrows/distance) x (9) = 810.

I.D. Bowhunter Rounds

There are about as many different outdoor bowhunter rounds as there are competitive bowhunter organizations. For good reasons, the following descriptions are deliberately kept simple.

I.D.1. NFAA 3-D Round

Although generally left up to the host club, a standard round usually consists of one shot each at 25 different 3-D animal targets. The NFAA National Unmarked 3-D Championship consists of one unit each day for two days. Adult shooting distances are nominally less than 50 yards. There are also youth and cub stakes at each target.

The target configurations and scoring rules are also flexible and are host-choice, but with approval prior to the tournament by the NFAA.

I.D.2. IFAA World Bowhunter Championship (WBHC) Rounds

In order to limit expenses incurred by the host organization, at least two WBHC Rounds are shot using paper (i.e., 2-D) animal targets. The remaining rounds (two or more) are host’s choice, and may be any one of the six 2-D or 3-D rounds defined in the IFAA *Book of Rules*.

I.D.2.a. Compulsory Round(s). The Compulsory Round is essentially the same as NFAA/IFAA Animal Round above, except that all distances are unmarked and the paper animal targets may any one of several commercial targets approved by the IFAA.

I.D.2.b. Alternate Rounds (Host’s Choice) The 28-target WBHC Alternate Rounds are quite varied, and are described in detail in the IFAA *Book of Rules*. In summary, these are:

- ◆ IFAA Unmarked Animal Round (same as Compulsory Round).
- ◆ 3-D One-Shot Round (similar to NFAA 3-D Round).
- ◆ 3-D Two-Shot Round.
- ◆ Special Animal Round (mixture of Timed Targets, Herd Targets, Group Targets, and Classical Animal Targets).
- ◆ Precision Round.
- ◆ Game Trail Round (includes tree stand and moving targets).

SECTION II OUTDOOR RANGE LAYOUT AND SIZE REQUIREMENTS

II.A. General

Safety is the overwhelming factor dictating range size. The actual shooting lane dimensions account for only a very small fraction of the total area requirement. Terrain is also quite important, especially in the layout of field and bowhunter ranges. Proper use of terrain can alleviate many safety concerns, particularly in providing natural backstops and buffers.

II.B. Field Archery Range

The development of a good field archery range always starts with a well thought-out plan. First, make a surveyor-type sketch of the property showing significant contours, creeks, etc. Better yet, use a large scale topographical map. Second, make a preliminary range layout on the topo sketch or map, considering all the safety criteria described below. [Be conservative!] Third, with three teams of two people each, stake each target's shooting line and target butt position carefully with respect to:

- ◆ The current target's orientation (distance and direction).
- ◆ The previous target's orientation, particularly the location of its target butt.
- ◆ The next target's orientation, particularly the location of its shooting line.

Hopefully, these steps will provide some assurance that you can actually have a good and safe range *before* committing lots of labor and dollars.

The NFAA has four size-related guidelines for laying out a field range (the IFAA's requirements are similar, but not as definitive):

- ◆ If the target is not backstopped (either fabricated or earthen), 25 yards or one-half of the target distance, whichever greater, shall be cleared behind the butt. [Note: This guideline was formulated in the recurve era. Today, it is suggested that "more-the-better."]
- ◆ A minimum clearance of 25 to 50 (safest) feet, depending on terrain and target distance, shall be provided between any path or shooting lane paralleling another shooting lane. Fifteen yards (45 feet) is a good compromise.
- ◆ The distance on each side of the target butt shall be greater than the target distance times the tangent of 15° to 30° (safest), depending on terrain and target distance. As a compromise, the tangent of 26.5° is 0.5, making it easy to "stake out" while surveying the range. For example, the safety zone on either side of a 40-yd target butt is $40 \times \tan(26.5^\circ) = 40 \times 0.5 = 20$ yards. The buffer zone behind this 40-yd butt would therefore be 25 yards deep by 40 (20 + 20) yards wide. This means that no waiting area or shooting position should be closer than 25 yards from a 40-yd target butt. See below for examples of other target distances.
- ◆ The target lanes must be sufficiently wide to support two archers shooting simultaneously side-by-side. Four-wide is highly recommended for the longer walk-up targets, which always seem to take longer to shoot.

In summary, and for initial range layout planning, the recommended safety zones to **each side** and **behind** field archery target butts are:

| Target Distance | Half-Width at Butt | Depth Behind Butt |
|-----------------|--------------------------|--------------------------|
| Up to 30 yds | 15 yds | 25 yds |
| 30 to 50 yds | One-half target distance | 25 yds |
| 50 to 80 yds | One-half target distance | One-half target distance |

The foregoing safety guidelines assume that in no case should an errant arrow cross the range boundary, even if the adjoining property is uninhabited. In other words, all the safety buffer zones must be included *within* the total range area requirements.

As mentioned before, terrain has a significant influence on field archery range layout and size. Ideally, the targets are laid out such that the archer never has to walk back on the lane just shot. [Exceptions are targets about 30 yards and less.] These walk-back targets require less land, but are an aggravation during tournaments because of the time wasted waiting for the lane to clear. More walking is required, too. "Walk-throughs," as on a golf course, are always preferred.

A reasonably shallow (and dry) gully, ravine, arroyo or similarly hilly terrain can be a great asset to a field or bowhunter range. Shooting from bank-to-bank, back-and-forth, across the gully not only provides natural backstopping, but reduces area and shooting-time requirements. Box gullies or canyons, which may be considered "waste areas" by others, are ideally suited to the field archer or bowhunter. On the other hand, waste areas subject to flooding are really only suited for large tournaments using temporary facilities. Flood plains are too flat and too risky. [Foam butts and 3-D targets float!]

Field ranges are often laid out in 14-target "loops," where all of the shots are outward, away from the center of the loop. This arrangement requires more land area because the center of the loop is not used, and because a large buffer area is needed around the perimeter. With judicious planning, however, the central core could contain a clubhouse and/or parking lot. In any case, the range should be laid out such that the Target 1 (and 15) entrance and Target 14 (and 28) exit are near the clubhouse or assembly area.

With the right terrain and under perfect conditions, a safe, 28-target field range, with no long walk-backs and with no fabricated backstops, but with a 10-target practice range, clubhouse and modest parking lot, *can fit on about 20 acres*. Thirty acres is more comfortable. 28-target ranges with lots of walk-backs and backstops can fit on as little as 15 acres. 14-, 42- and 56-target field range size requirements are proportional to the 28-target requirement, considering that about two acres is needed for a nice practice range, and about one acre is needed for the parking lot and building(s). For initial planning purposes, a *rule-of-thumb is one acre per target*.

II.C. Target Archery Range

Outdoor target archery range size requirements are easy to define because: (1) terrain is not a factor, and (2) all targets are walk-backs. Factors relating to a "first class" outdoor target range layout are:

- ◆ The ground should be flat, free of obstructions, and the shooting direction should be within 45° of true north in the Northern Hemisphere (shooter less likely to face sun).
- ◆ Each shooting lane should be no narrower than 10 feet or about 3 yards.
- ◆ Safety (buffer) lanes along the side boundaries should be no less than 15 yards.
- ◆ The safety area behind the target at the longest distance should be no less than 40 yards.
- ◆ Five yards minimum is recommended behind the shooting line for the competitors, plus at least another 5 yards for bow racks, chairs, etc.

Therefore, a 10-target NFAA 900 Round or American Round target range requires, at a minimum:

- ◆ Width = (10 x 3) + 15 + 15 = 60 yards.
- ◆ Length = 5 + 5 + 60 + 40 = 110 yards.

This 10-target range requires less than 1½ acres, of the right shape. It would fit nicely on a standard soccer or football field, including side and end zones.

II.D. Bowhunter Range

As with field archery ranges, the actual land area required between the shooting stakes and targets is a small fraction of the total bowhunter range area required. Although the distances shot on a bowhunter range average less than those shot on a field range, there are several factors which make the total area requirements greater:

- ◆ Arrow speed as well as the probability of arrow ricochet are higher for the bowhunter than for the field archer, and since fabricated backstops are not desired (for the sake of realism), the *safety zones should be at least twice the size suggested for a field range*. Earthen backstops, however, either manmade or natural, will help quite a bit.
- ◆ Paths to and from the target should never be along the sight-line between the shooting stake and target. Again, for realism and fairness to all, more area is required to preserve the natural habitat behind and in front of the target.
- ◆ A bowhunter range is rarely shot the same way twice. That is, either the targets or stakes, or both, are relocated for each tournament. This practice obviously requires a land "reserve" not needed for a permanent range. [Remember, however, bowhunter ranges with permanent butts or manmade earthen backstops do not have the same freedom of relocating the targets for each shoot. Only the stakes can be moved.]
- ◆ Ideally, the animal targets should be matched with their habitats. If you use a large variety of targets, then you need a large variety of habitats; thus requiring more land area.

In summary, a rough estimate of the land area required for a bowhunter range is 50% more per target than for a field range. A typical field range requires about an acre per target; therefore; a typical unmarked bowhunter range needs about *1½ acres per target*. Therefore, a 20-target range needs *30 acres minimum*. The more the better, however.

SECTION III OUTDOOR TARGET BUTT AND BACKSTOP CONSTRUCTION

III.A. Field Archery

The minimum size requirements for field archery butts are based on the target faces being shot. For example, the following table relates butt dimensions with target configuration:

| Distance | Critical Target | Minimum Butt Dimensions |
|--------------|-----------------|-------------------------|
| Up to 15 yds | 4 x 4 – 20-cm | 36" x 36" |
| 15 to 35 yds | 2 x 2 – 35-cm | 30" x 30" |
| 35 to 40 yds | 1 x 2 – 50-cm | 30" x 42" |
| 40 to 80 yds | Group 1 Animal | 42" x 42" |

Considering that a compressed bale of excelsior is about 15" x 15" x 42", two-bale butts are barely adequate for field targets from 15 to 40 yards (assuming no vertical Group 1 Animals). Butts three bales high are required for the "snake eyes" and all target distances 40 yards and greater. Butts four feet square are amply sized for both field and target archery.

It wasn't too long ago that excelsior was the most common target butt material. Today, however, there are literally hundreds of different materials available worldwide, including various fibrous natural materials, forest or agricultural by-products, bundled rags and recycled plastic, but mostly a wide variety of the more expensive castable or moldable foams and composite materials. Moreover, the trend seems to be toward the purchase of commercial, full-sized, pre-fabricated, target butts.

A medium cost compromise is the do-it-yourself fabrication using cardboard, insulation board, or any one of many sheet foam materials, stacked and compressed in a custom made screw-down frame. Foams have several advantages: (1) they're available in a variety of thicknesses and densities, (2) they can be cut to any size or shape, and (3) they're both weather-proof and varmint-proof. Unfortunately, some foams have great "grabbing power," making it difficult to extract the arrows; plus, some foams tend to "goop up" arrow shafts, especially those made of composite materials.

Although the target butt may be waterproof, ordinary paper target faces need protection from the rain, especially if they're to be shot more than one day. A simple roof over the butt will suffice. The roof should be a little higher than six feet from the ground (to allow for head clearance), and about four feet wide.

Unlike indoor archery, there is no minimum height above the ground for field archery target faces. Since a standard wooden pallet is the most common base, about 5 inches is the practical minimum. A platform about 16 inches above the ground is much better, since the center of the target would then be about waist-high, making it easy to score and extract arrows.

The butt platform, roof and supporting posts should be made from materials that won't damage an errant arrow. Ordinary pressure-treated pine is good. If steel fence posts are used to hold the butt upright, then keep the posts at the edges, but behind the butt out of sight. It is also a good idea (and welcomed by all novice shooters) to keep the ground around the butts free of rocks and large stones, especially at targets longer than 50 yards.

With a little luck and ingenuity, a two-bale excelsior target butt, with platform and roof, can be constructed for less than \$100, excluding labor and equipment purchase or rental.

As noted above, unnatural target backstops are not desired on a field archery range unless dictated by safety concerns. Besides, fabricated backstops are eyesores, and can be quite expensive, unless natural materials, such as stacked logs, can be used.

A rule-of-thumb for backstop size is three butt-widths wide and two butt-heights high. For example, a backstop behind a 4 x 4-ft butt would be 12-ft wide by 8-ft high. That equates to three, 4 x 8-ft, ½-in (or thicker), exterior-grade, plywood panels mounted vertically. Of course, other materials are available. The only requirement is that the backstop must decelerate the arrow to zero, without substantial damage to the arrow, and without endangering anyone on or off the range.

III.B. Target Archery

A few years ago, the most common butt used for outdoor target archery was the classic, circular, 50-inch diameter, grass butt. These heavy and expensive butts, however, may no longer be in production. Square butts made of the newer, lighter weight, foam or composite materials are now much more popular, and are sized to hold the standard 122-cm FITA face. Light weight and portability are also desired to accommodate those tournaments where the shooting line remains fixed while the butts and their standards (easels) are moved as the distances are changed.

Target butts similar to those used on a field archery range may also be used, as long as portability is not required, and if the butts are sufficiently large to hold a standard 122-cm FITA face. Moreover, FITA faces are mounted such that the center is about 50 inches above ground, and tilted about 15° from vertical. For target rounds other than the 900 or American Round, common sense prevails. *Obviously, kids shooting target archery at summer camp need targets sufficiently low to reach their arrows.*

Backstops are rarely required on a target archery range primarily because all the archers are shooting at the same time, and no one is allowed behind the targets except when all are scoring their arrows. Likewise, spectators must be clear of the safety zone behind the targets.

III.C. 2-D Animal Targets

If required, target butts and backstops needed for a two-dimensional animal round, such as the WBHC Compulsory Round, are the same as those used on a field archery range.

Broadhead target butts and backstops are not addressed herein.

III.D. 3-D Animal Targets

A wide variety of very durable and realistic three-dimensional animal targets are now commercially available. The more popular brands have standard scoring lines engraved, and have replaceable sections, plugs, and/or back-up blocks for do-it yourself target refurbishment.

Reasonably realistic semi 3-D animal targets can also be handmade. A full-sized, color-printed, paper, animal target is glued on cardboard, and backed-up by an ethafoam (or similar) slab. The complete target is then cut out around the animal outline.

3-D animal targets are generally very portable, which means that a completely different bowhunter range can be set-up overnight. Some targets even have integral support stakes, while others are merely tied to any convenient tree or sapling.

The price of these 3-D animal targets is heavily dependent on size, realism and durability; and whether you buy or make them.

SECTION IV OUTDOOR RANGE FACILITIES AND ACCESSORIES

IV.A. Items Any Archery Range Can Use

- ◆ Adequate parking area.
- ◆ Covered shelter, pavilion or clubhouse.
- ◆ Registration table or counter.
- ◆ Storage shed for spare targets, butts, stakes, target pins, tools, etc.
- ◆ Picnic tables and benches
- ◆ Scoreboard.
- ◆ Toilet facilities (primitive, portable or otherwise).
- ◆ Practice area (covering longest distances on actual range).
- ◆ Bow racks, at both practice area and registration area.
- ◆ Bulletin board for target assignments, tournament rules, and other announcements.
- ◆ Public address system, at least for large tournaments.
- ◆ Waste containers.
- ◆ Water jugs and cups, throughout the range.
- ◆ Concession area.
- ◆ **WARNING! ARCHERY RANGE** signs around range boundary

IV.B. Field Archery Range Items

- ◆ Bow racks at each target butt
- ◆ Direction signs.
- ◆ Target number and target distance signs.
- ◆ Benches, at least five yards behind farthest shooting stake.

IV.C. Target Archery Range Items

- ◆ Portable bow racks behind shooting line
- ◆ Target number placards.
- ◆ Wind direction indicators.
- ◆ Chairs and beach umbrellas, if not provided by the competitors
- ◆ Timing lights.
- ◆ Tournament Director's platform.

IV.D. Bowhunter Range Items

- ◆ "On Deck" area, at least ten yards behind the next target's shooting stake
- ◆ Trail markers (signs, cord or tape).
- ◆ Target number and description signs (post in "On Deck" areas).
- ◆ Novelty event set-up, such as running deer, long-distance shoot, archery poker, etc.

SECTION V DESIGNING AN OUTDOOR RANGE FOR SAFETY

V.A. General Range Safety

Safety on any archery range is comprised of three elements:

- ◆ Archery tackle.
- ◆ "Stupid Human Tricks."
- ◆ Range layout, targets and backstops.

Only the last item is discussed herein, and only for field archery and bowhunter ranges. Since target archery range layouts and shooting rules are specifically structured to avoid unsafe conditions, safety issues are fairly rare. Likewise, proper archery training and/or bowhunter education should handle the tackle and human elements.

It should be remembered that range design criteria can't be separated from range safety criteria. ***The first priority is — always — every archery and bowhunter range must be designed for safety.*** The following material, therefore, emphasizes the most important safety issues related to the range and equipment design criteria outlined in the foregoing Sections II, III and IV.

V.B. Field Archery Range Safety

Field archery range safety may be divided into two categories: (1) factors related to range layout and terrain, and (2) factors related to maintainable items, such as target butts, target lanes and lane obstructions. The NFAA addresses both of these factors quite well in its Range Inspection Requirements. NFAA-chartered clubs with field ranges must be re-inspected every two years, and it's obvious that a club won't host many tournaments, invitationals or even club shoots, without being certified safe, and subsequently proven safe by repeated use.

The problem, unfortunately, is with temporary ranges set up specifically for large sectional or national tournaments. This problem is the result of (1) too many ranges being built on not enough land, (2) not enough help, and (3) not enough time. Very few ranges are perfectly safe the first time, which means that unless inspection teams conduct a "shoot-through" on the new range, there's a good chance that *there will be a significant safety issue* during the first day's round. Here's a summary of the kind of things often missed because of not having a "shoot-through":

- ◆ Waiting areas and shooting positions at the next target within the danger zone of the preceding target. This is the result of not having enough land. The NFAA's outdoor range safety guidelines, as described above, are good rules-of-thumb.
- ◆ Target butt positioned such that a road, path or another target is directly behind the butt, even if at a reasonably safe distance. *Any* unnatural movement in the sight window can cause an equally unnatural flinch and inadvertent arrow release.
- ◆ Lack of backstop or inadequately cleared area behind target butt. People *will* miss, and they *will* look for that missed arrow. Uncleared brush not only increases the chance of a ricochet, but it also increases the exposure of the search party to danger zones behind other targets.
- ◆ Leaky butts. Even if you never miss, pass-throughs put you in the same position as the guy who does miss the target.
- ◆ Non-backstopped target positioned on a brow of a hill, such that a missed shot becomes a flight-shot.
- ◆ Uncleared paths to and between targets. Here, we're talking about safety afoot. The usual method

of clearing field archery lanes is to brush-hog the saplings about one or two inches above the ground — just high enough to trip head-over-heels.

- ◆ Inadequate clearance above target lane. Even with a "shoot-through," the range inspectors often miss the fact that light-bowed and traditional shooters require more vertical clearance.
- ◆ Walk-ups which are also fan shaped. The problem here is that unlike a straight walk-up, an angled walk-up often gives the option of shooting four at a time. It depends on the angle of the fan whether this is safe or not. If there's any question, *don't shoot!*

V.C. Bowhunter Range Safety

Here are some problems unique to bowhunter ranges, some of which are noted elsewhere here:

- ◆ Non-yielding obstructions (e.g., trees and limbs) blocking the animal kill area. When setting up a 3-D target, don't make the shot any different from that you would take in a real hunting situation. Moreover, remember the short person, the lefthander and the light-bowed bowhunter.
- ◆ Overlapping "miss" areas behind the targets. Because of no backstops and because of more missed shots (at 3-D targets), special care must be taken to make sure that a missed arrow doesn't end up behind another target.
- ◆ Steeplejack treestand shots. Shooting from elevated platforms is fun (although often bottlenecks), but don't make the shots ridiculously difficult — like hanging out over the railing. Also, make sure that the bow limb won't slap any part of the tree or platform upon release.
- ◆ Again, the "On Deck" area and shooting stakes at the next target being in the danger zone of the preceding target. The NFAA's safety buffer rule is even more important on a bowhunter range, especially if it's heavily wooded (more ricochets)

SECTION VI SUMMARY OF INDOOR ARCHERY GAMES

VI.A. NFAA/IFAA Indoor Round

VI.A.1. Standard Unit

A standard unit consists of 60 arrows at 20 yards. NFAA cubs shoot at 10 yards. Normally, this round consists of 12 ends at 5 arrows per end, but the NFAA allows the option of 15 ends at 4 arrows per end.

VI.A.2 Targets

VI.A.2.a. "Single-Spot" Target. This target face is 40 cm in diameter and is dull blue with a white center spot. The spot is 8 cm in diameter with a 4-cm X-ring. The spot is scored as a 5 while the X-ring is used for tie-breaks only. The diameter of the 4-ring is 16 cm, 3-ring 24 cm, 2-ring 32 cm, and the 1-ring 40 cm.

VI.A.2.b. "4-Spot" and "5-Spot" Championship Targets. These target faces consist of either four (NFAA only) or five (NFAA and IFAA) 16 cm targets on a single, 40-cm, screened blue surface. Scoring is the same as the single-spot target; however, there are no 3-, 2- or 1-rings to score. These "one-arrow-per-target" optional target faces are designed for the precision shooter who wishes to avoid glance-outs or damaged arrows.

VI.A.2.c. Target Set-Up. Normally, four target faces are mounted side-by-side, top-to-bottom on each target butt. This allows two archers per butt per line. Line 1 shoots the bottom targets, while Line 2 shoots the top targets.

VI.B. Vegas Round

The Vegas Round is shown here only because it is the indoor round shot at the annual, and very popular, World Archery Festival (WAF), now owned and managed by the NFAA. Because of its popularity, it is often a round shot at many local indoor tournaments and leagues

A standard unit consists of 10, 3-arrow ends at 18 meters (about one foot short of 20 yards). Adults shoot three of these units at the WAF for a perfect score of 900. The Vegas target face is the same as the indoor FITA "triple face." Each triple target is merely the 20-cm center portion of the 40-cm FITA face. That is, there's two gold rings (plus X-ring), two red rings and one (inner) blue ring.

SECTION VII INDOOR RANGE LAYOUT AND SIZE REQUIREMENTS

VII.A. Shooting Distances

The most common indoor shooting distance is 20 yards maximum, which encompasses the 18 meters used at the World Archery Festival, as well as at most FITA and JOAD indoor tournaments.

Total depth of an indoor range is the maximum shooting distance, plus, of course, the clearance distances needed behind both the shooting line and the target butts. Normally, a minimum clearance of 5 feet is required behind the butts to allow for a backstop, as well as sufficient "elbow room" to retrieve arrows which may have passed through the target butts. Clearance behind the shooting line should not be less than about 15 feet to allow room for bow racks, benches, tables, traffic, etc. Ten yards (30 feet) is much more desirable.

Therefore, a "standard" 20-yard indoor archery range requires a total depth of nominally 80 feet. A depth greater than 80 feet will permit either more "roaming" room or greater shooting distances.

VII.B. Lane Width and Side Clearance

The absolute minimum lane width is 24 inches. For "mature" adults, however, 30 inches is much better. Of course, the target butts must be spaced accordingly. For two lanes per butt, the 30-inch lane means that the butt centerlines are 5 feet apart. The 24-inch lane means that the nominally 48-inch butts are touching side-by-side.

The NFAA requires that, "All pillars or structural parts of the building, ... shall be properly protected so as not to damage arrows and to prevent rebound to the shooting lines."

VII.C. Height Clearance

For a 20-yd range, the NFAA requires a minimum vertical clearance of 8 feet, 6 inches. For kids with light bows, 10 feet is probably better. This clearance is between the floor and *anything* hanging from the ceiling in the line-of-fire, such as structural beams or light fixtures. Obviously, light fixtures immediately above the target butt are not in the line-of-fire, and only need to be head-height.

VII.D. Overall Range Dimensions

Assuming 5 feet per target butt (two lanes), a 30-foot wide range will support 12 lanes, or 24 people in two shooting lines of league play. Widths greater or less than 30 feet should be divisible by 5 feet (or slightly less) in order to accommodate whole units of target butts. Obviously there is no minimum or maximum range width requirement ... only what's affordable.

In addition to both the 80-foot depth requirement and the recommended 30-foot minimum width, sufficient floor space should be allocated for:

- ◆ An entry area.
- ◆ Registration counter (or cashier).
- ◆ Score tallying and posting area.
- ◆ Restroom(s).
- ◆ Heating and/or air conditioning facilities.
- ◆ Utility, storage and/or office area.
- ◆ Designated smoking area.
- ◆ Pro shop or retail sales area.

SECTION VIII INDOOR TARGET BUTT AND BACKSTOP CONSTRUCTION

VIII.A. Target Butt Dimensions

If square or rectangular, the width or height of a target butt shall not be less than 40 inches. 48 inches is preferred; and if a circular butt is used, the minimum diameter shall not be less than 48 inches. Butts of these sizes will hold four NFAA/IFAA or WAF target faces.

NFAA requires that the bottom of the target butt be at least 16 inches from the floor.

For easel-mounted butts, the backward tilt cannot be more than 15° from vertical, and the tilt-angle must be the same for all butts used in a tournament. A perfectly vertical target face is ideal, but care must be taken to avoid having the butt pitch forward during arrow removal.

The thickness of a target butt should be no greater than the length of the shortest arrow. A completely buried "pass-through" is almost impossible to extract.

VIII.B. Target Butt and Backstop Materials

As with outdoor target butts, an indoor target butt may be constructed of any material as long as:

- ◆ It doesn't damage or "goop up" the arrows.
- ◆ It doesn't allow frequent pass-throughs.
- ◆ It allows the arrows to be withdrawn easily, or at least without much effort.

Excelsior, corrugated cardboard and sheet sheets are the most common materials used for "permanent" indoor target butts. Although cardboard is relatively inexpensive, especially if scrap can be found, a frame must be constructed for each butt to hold the compressed cardboard sheets in a neat vertical stack.

As with outdoor butts, a variety of foam materials are also suitable for indoor use. Portable versions on

standards (easels) are quite popular at the large, arena-sized, indoor tournaments. Unfortunately, some of these foams have great "grabbing power," making it difficult to extract the arrows. Other foams tend to leave a messy residue on the arrow shafts.

An indoor target backstop may be made of any material as long as it doesn't damage any pass-through, overshot or sideshot arrow. The NFAA requires the backstop to be at least 8 feet high. Standard sheets of (thick) plywood, butted side-by-side, are commonly used as backstops. For large tournaments in temporary facilities, a curtain-like, closed-mesh fabric backstop is also common.

SECTION IX INDOOR RANGE LIGHTING, ACCESSORIES, SPECIAL EQUIPMENT AND SAFETY

IX.A. Lighting

The minimum illumination recommended is 30 foot-candles, measured at the target faces. 30 foot-candles throughout the range is good; however, care must be taken to shield the shooters' eyes while standing at the shooting line. On the other hand, there must be sufficient illumination at the line for reading sight marks and doing other close work.

Fluorescent overhead light fixtures are recommended because of the uniform illumination and lack of harsh shadows. Floor-mounted fixtures in front of the butts are sometimes used to augment target illumination. Special precautions, however, are advised to avoid tripping over these fixtures on the way to and from the target butts.

IX.B. Routine Indoor Range Accessories

Items needed for both drop-in and league shooters include:

- ◆ Bow racks. These must be located at least 5 feet behind the shooting line. Remember to provide enough racks to handle a full-house of shooters (two times the number of lanes). Also, remember that many bows have extra long stabilizers and/or extra short limbs.
- ◆ Equipment tables. Places are needed to store tackle boxes and to assemble/repair archery tackle. Inexpensive, folding, "cafeteria" tables are quite adequate.
- ◆ Chairs or benches. These, along with the tables noted above, should be located behind the bow racks, and should provide sufficient seating for the expected number of spectators, plus at least one-half the number of shooters.
- ◆ Coat racks or hooks.
- ◆ Water fountain, restroom(s), designated smoking area, etc.

IX.C. Specific Items Needed for Indoor Leagues and Tournaments

Some things that *may or may not* be provided by league or tournament sponsors include:

- ◆ A 10-foot "dropped arrow" line.
- ◆ Visual timer. Depending on the tournament, a stoplight-like timer is usually required. Green is for **START SHOOTING**, amber is for **ONE MINUTE TO GO**, and red is for **STOP SHOOTING**. The timer may be overridden by a tournament official behind the shooting line.
- ◆ Raised platform behind the shooting line for the Tournament Director and Clock/Timer Operator.
- ◆ Scorecards and scoreboard.
- ◆ Target faces.

IX.D. Some Special Safety Precautions for Indoor Ranges

Some additional common sense safety rules include:

- ◆ Never let anyone draw a bow, with or without an arrow, except while standing at the shooting line and pointed toward a clear target.
- ◆ Never allow crossbows or bows with unguarded overdraws to be shot in an indoor archery range.
- ◆ Never let anyone shoot obviously damaged or defective equipment.
- ◆ Unless the range is specifically designed for it, never allow broadheads to be shot indoors.

SECTION X DESIGNING A RANGE FOR WHEELCHAIR ACCESSIBILITY

X.A. Types of Physically Disabled Archers

Disabled archers participating in the 1996 Paralympics were separated into three classes:

- ◆ Quadriplegic – Requires wheelchair at all times on the range, and can use specially adapted archery tackle.
- ◆ Paraplegic – Requires chair (not necessarily wheelchair) at the shooting line. No provision for special tackle.
- ◆ Standing – Has the ability to stand at the shooting line, but requires assistance (prosthesis, crutch, wheelchair, etc.) to move around the range.

“Wheelchairs” come in various classes, too. The motorized versions with small balloon tires are ideally suited for all outdoor archery games. The classic, narrow-wheeled, manual wheelchairs are best suited for indoor shooting or on “soccer field” target ranges.

X.B. Indoor Ranges

Assuming that the building is already wheelchair accessible, nothing special is needed for an indoor range, except to provide more maneuvering room behind the shooting line. Also, since a wheelchair requires extra lane width at the shooting line, it's customary not to have two shooters on the same butt. This custom applies to target archery, too.

X.C. Outdoor Target Ranges

Because of the flat terrain, outdoor target archery ranges require very little modification for the wheelchair archer. Narrow-wheeled wheelchairs, however, just don't work in sand, loose soil or gravel. Unless some assistance is provided in scoring and retrieving the shooter's arrows, lanes to the target must also be hard packed and free of obstructions (rocks, stumps, etc.).

X.D. Field Archery and Bowhunter Ranges

Designing for *manual* wheelchair accessibility on roving-type archery ranges is most challenging. Here are the general design criteria:

- ◆ Grade less than 10% (about 6°).
- ◆ Avoid walk-through target arrangements.
- ◆ Hard packed soil.
- ◆ Lanes and paths clear of rocks, brush, stumps, etc.
- ◆ Extra wide shooting lanes.
- ◆ All bridges wheelchair accessible and wheelchair-safe.
- ◆ Other accessibility features in place, such as restrooms, etc.

Because of the desire to have both a varied target layout and natural habitat realism, a bowhunter range with manual wheelchair accessibility is almost improbable. As noted above, if the terrain is very flat, or if the disabled archer can use an ATV (and has a buddy to help score and retrieve arrows), then the challenge to hold a wheelchair accessible 3-D Round is somewhat lessened.

Alternately, and if cost is of little concern, an 100% accessible wheelchair bowhunter range can be (and has been) built. It's possible to have easy access to the 3-D animal targets (to retrieve arrows), and to even have elevated platforms (simulating treestands or downhill shots). With paved paths (or boardwalks), fabricated ramps, and targets fixed in-place, some realism is obviously lost. The fun, however, is never lost.