ABSTRACT

Commercial whitetail deer farming is a growing industry in the U.S. The size of operations ranges from a few head to hundreds. Management ranges from small, part-time farmers to professionally-managed operations. There is, however, a lack of published information documenting investment costs, operating costs, cash flow, and profitability of whitetail deer enterprises. This article provides that information. Based on interviews with the Board of Directors for Whitetails of Oklahoma, small and mid-sized farms are modeled, providing construction and operating costs for both. Projected cash flow budgets and net present values under various sale price assumptions are also reported. The likelihood of profitability is directly tied to the sale price of bucks. At prices less than $2,750 for a smaller-sized farms and $3,000 for mid-sized farms, profitability is highly unlikely.

CONSTRUCTION AND OPERATING COSTS FOR WHITETAIL DEER FARMS

By Eric A. DeVuyst

Introduction

Whitetail deer are farmed in the U.S. for both venison and hunting, with hunting demand leading to rapid growth of the industry. High-fenced hunting provides hunters with an opportunity to harvest high-quality deer in a shorter time frame than free-range hunting. Whitetail deer farmers provide the quality deer demanded by these hunters. Whitetail deer are members of the cervid family that includes mule deer, elk, and moose. In 2007 there were 7,828 cervid farms in the U.S. (Anderson et al., 2007) with 5,654 deer and 1,917 elk farms (USDA NASS, 2007), a 15 percent increase from 2002 to 2007.

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Cervids have been farmed in Europe for over 2,000 years (Burden, 2009), 4000 years in Phoenicia (Evers, undated), 5000 years in China (Evers, undated), and in the U.S. since the late 1800s (Thorleifson, 2003). However, commercial farming of cervids is a recent phenomenon, rapidly becoming an important economic activity. Anderson et al. (2007) reported that the total economic impact from U.S. cervid farming was over $1.1 billion and accounted for 29,000 jobs.

Whitetail deer farms range in size from small, part-time operations to large scale, professionally managed farms. Most U.S. farms are operated by small, part-time farmers with off-farm jobs. Whitetail deer farming provides an alternative enterprise for many of these farmers. Space requirements are fairly small and reasonable time requirements make it attractive to small farmers. Large size farms are often operated to provide high-quality bucks for the owners' high-fenced hunt areas with profit and cash flow as secondary considerations. Regardless of size, there are few published whitetail deer farming economics resources available. Given the relatively recent introduction of commercial deer farming, this is not surprising. Few land grant universities provide farmed deer management information. Iowa State University (2010) provides cervid farming case studies and links. Texas A&M (2010) has a research station dedicated to exotic deer and elk production.

This lack of information poses challenges for potential owners and managers. While many state Cooperative Extension Services provide crop and livestock budgets and training programs, equivalent information is not available for deer farming. To address that need, Oklahoma State University recently developed a farmed whitetail deer Extension program. As part of that project, construction and operating budgets for start-up whitetail deer farms were developed. This paper reports those budgets. Although developed for Oklahoma, these budgets should be applicable to the U.S. southern plains. With modification for local prices, the framework should be applicable to much of the U.S.

Model

Two different sizes of operations are explicitly considered. First is a small-size business that produces eight to sixteen deer annually. Second is a mid-sized business that produces 24 to 48 deer annually. Cash flow and profitability are often less of a concern for large size operations – given their operating objectives – but the cost of budgeted items also apply to these operations. Large size operations will usually have additional investments. For example, a tunnel system and working facility would typically be constructed in a pole barn on large size operations. These facilities are used to ease the processing of large numbers of deer.

The costs of building materials, the materials required, and operating costs were collected through interviews and discussions with members of the Whitetails of Oklahoma. Personal interviews with producers and two developers, group discussions, study tours, and telephone conversations were used to compile the information.

Facility Descriptions and Material Pricing Information

Deer farm pens are made of eight-foot tall woven-wire fences supported with 10 foot T-posts. Used

oilfield pipe (2-3/8" diameter) is used for corner bracing and gate opening bracing. Pens are arranged in blocks to allow deer to be moved between pens and working facilities and reduce construction costs. Contiguous pens have a vertically-sliding gate, called a guillotine gate, on shared fence lines. Guillotine gates can be opened and closed via cable and pulleys from outside the pen, allowing for lower stress and safer deer handling. Working facilities include specialized handling equipment designed to prevent injury to deer and workers. Small- to mid-sized operations will often forgo working facilities because of ownership expenses. Instead, a dart gun is used to anesthetize deer to treat diseases and injuries, collect semen, artificially inseminate, and dehorn. Prices for construction materials are summarized in Table 1.

The small-size operation (Figure 1) consists of four pens of 15,000 square feet (123' × 123') and one of 30,000 square feet (123' × 246'). Pens are arranged in a block with a 12-feet central alley. Outside corners are cut at a 45 degree angle to mitigate deer behavior of congregating in corners. Entry gates into the main alley are 12 feet wide by 8 feet high. The exterior of the facility is surrounded with a two-wire electric fence to deter predators. The materials and costs for the small-size farm are reported in Table 2. For small-size farms, pens are assumed to be constructed over a three-year period to ease cash flow and match space requirements. In year one, the three left pens are constructed. In year two, the alley and the bottom right pen are built. In year three, the large pen is constructed. For mid-size farms, pens are assumed to be built in the first year but could be constructed over three years.

The mid-size operation is shaped similar to Figure 1, except that there are six pens of equal size. Each pen is 30,000 square feet (173' × 173') with a 12 foot central ally. The construction costs (Table 3) are reported for a single year, but could be spread over three years.

Labor for construction is assumed to be provided by the owner/operator. Although there are no statistics to support this assumption, Drake and Grande (2007) reported that 90 percent of survey respondents had constructed their own deer predation fences. While not the same as deer confinement pens, it does indicate that many farmers have the ability, time and equipment to construct fencing.

Another necessary purchase is a dart gun for administering medications and anesthetizing deer. Dart guns range from $300-$3,000. A serviceable dart gun, powered with .22 caliber blanks, can be purchased for $700.

Feed Costs

Per head production expenses are summarized in Table 4 for the small-size operation and in Table 5 for the mid-size operation. A standard ration for deer includes alfalfa and high protein (20%), high fat (8%) feed, called "sweet feed." Alfalfa price will vary with local supply and demand conditions. A 75-pound bale of alfalfa will vary from $6-$12 in the U.S. southern plains. A high protein, high fat pelleted feed will cost around $440/ton.

Four adult deer will consume a bale of alfalfa in one week. The bale needs to be "flaked" as deer will

only consume leaves. Fresh alfalfa is fed daily with unconsumed stems removed from pens. Alfalfa that is exposed to moisture will spoil quickly and harbor pests. So, it should be removed from pens and surrounding area.

Adult deer (bucks and does) will consume about 4.2 pounds per day of a sweet feed. Again, fresh feed should be offered daily. Refusals should be removed if exposed to moist conditions or unconsumed for more than two days.

New-born fawns should be allowed to nurse from their dams to consume colostrum. Within a few days of birth, doe fawns are segregated and bottle fed. Milk replacer costs $36-$45 for 25 pounds. It will cost around $100 for milk replacer per doe fawn. After two weeks, doe and buck fawns will consume about one pound of sweet feed. Bucks that become too acclimatized to humans can become a danger to humans. During the rut, bucks become aggressive and, if in contact with humans, have been known to injure and even kill workers. So, bucks are allowed to nurse on their dams. After weaning (around 12 weeks of age), both buck and doe fawns should be fed sweet feed (up to 4.2 lbs. per day) and alfalfa.

The feed expense for the mid-size operation includes the expenses listed above and a few additional feed expenses. As is discussed later, a mid-size operation is assumed to purchase breeding stock with a higher genetic potential for large antlers. So, the goal is to provide sufficient nutrition to allow bucks to reach their genetic potential. Doe fawns receive one-half pound per day of "calf manna" at $0.42 per pound. Doe fawns also receive one-half pound of a 38 percent protein pellet. After weaning bucks have free choice to 38 percent protein pellets at $0.45 per pound. Initially, weaned bucks receive 1-1.5 pounds of 38 percent protein pellets per day, increasing to 1.5-2 pounds by 180 days post weaning. Doe and buck fawns receive a dose of probiotic at $2 per dose. Adult does and bucks receive the same ration as in the small-size case.

Veterinary Costs

Captive deer in the southern plains should be vaccinated for Blue Tongue and Epizootic Hemorrhagic Disease (EHD). Vaccine currently costs $250 for 100 ml. A single dose is three milliliters for mature deer and three doses are administered annually for adult deer. The annual vaccination cost per breeding animal is about $23 per head. Fawns will require an initial vaccine of 2 ml. with a booster of 3 ml. The cost for vaccinating a fawn is about $13 per head above the owner's labor.

Every three months, animals are dewormed. Deworming pellets cost $24 for 50 pounds. Four does will require 100 pounds per treatment. Note, lower cost methods of internal parasite control might be available. Oral dewormers can be administered. Producers should check with their veterinarian for advisability of this method. External and internal parasites can also be controlled with topical and/or injectable parasiticides. Fawns are wormed after four to five months of age. Other veterinary expenses that should be budgeted include therapeutic treatment for pneumonia. A dose of penicillin costs $1.20-$1.60 for a 6-8 ml. injection. Darts for use in a dart gun cost $16 for five darts. A four-doe herd requires at least three packages annually.

Miscellaneous veterinary supplies, including needles and syringes, are budgeted at $4 per head. If TB/Brucellosis testing is required, an additional $50 per head should be budgeted. In the mid-size case, does will be artificially inseminated (AI) and a "clean-up" buck used. AI procedures cost $710 per doe for semen, drugs, and veterinary services.

Other expenses to consider including liming and reseeding of pens and midge control. Pens may be limed annually to reduce disease problems and reseeded with legumes. In addition to providing some feed value, grazing is a social activity in deer herds. Liming and reseeding costs will vary with pen size. For budgeting purposes, $100 per mature doe and buck is assumed. As midges are the primary vector for Blue Tongue and EHD, many producers spray pens and surrounding areas during the summer months. Midge control costs vary by location. For budgeting purpose, $5 per head of mature deer is included.

Breeding Stock Prices and Assumptions

The small-size case assumes that the grower purchases four artificially-inseminated (AI) does. AI does of lower-quality genetics will cost around $1,500 per doe. Note, high genetic quality does will cost over $5,000 and can cost in excess of $10,000. By purchasing bred does, the grower will not need a breeding buck until later in the first year of operation. A new breeding buck is purchased every seven years.

In the fall, the grower will need either a breeder buck or to artificially inseminate. A 1.5 year-old breeder buck of lower quality can be purchased for $1,500 - $2,000. Artificial insemination is costly, but may be necessary if the breeder decides to improve herd genetics. Good quality semen is available for $300 per straw. Each straw is used on two does. However, the veterinary costs are high. The drugs for anesthetizing and breeding currently cost about $310 per head. A veterinarian will charge around $250 per doe for AI service. The total cost to AI is about $710 per doe, making the purchase of a breeder buck desirable for most small producers.

In the mid-size scenario, twelve AI does are purchased at $6,000 per head with a range of $4,000 to $14,000. A breeder buck is purchased for $8,000 with a range of $5,000 to $15,000. The breeder buck is used to "clean-up" does that do not conceive through artificial insemination. The use of artificial insemination allows the operator to acquire higher quality genetics at a lower cost than buying a buck of top genetics. The model assumes that the breeder buck is replaced every seven years.

Death Loss

Death loss in captive deer populations is highly variable. EHD and Blue Tongue can claim over 50 percent of herd in a few days. In some areas of southern plains, losses to EHD and Blue Tongue are rare but in other areas outbreaks occur annually. For budgeting purposes, a minimum loss of 10 percent should be considered for all age classes.

Sales

Producers will generally not sell deer until their third year of operation. However, there are markets for younger deer. Weaned does of lower quality genetics sell for $500 and weaned buck fawns sell

for $750. At 1.5-2.5 years of age, an open doe might bring $750 and a bred doe $1,250. A yearling buck can bring $1,000 or more depending on antler size. At 2.5 years of age, a buck sells for $1,500 or more.

Market prices for weaned doe fawns from mid-sized producers bring $1,500 or more. Weaned buck fawns bring $1,500+. At 1.5-2.5 years of age, bred doe prices range from $2,500 to $4,000. A yearling buck can bring $1,500 or more depending on antler size. At 2.5 years of age, a buck will often bring $2,000 or more.

For the mid-size farm, semen might be sold from the breeder buck given the higher quality of the breeding buck. Up to 50 straws per year might be sold for $150-$300 per straw depending on the quality of the buck.

Results

The capital and operating budgets for the small-size farm are reported in Table 6 and the corresponding cash flow budget is reported in Table 7. These budgets are reported in Tables 8 and 9 for the mid-size deer farm. Sale prices for the bucks are varied over a range for each size. Net present values are computed assuming constant real costs, a three percent real discount rate, and a 20-year time horizon. At lower sale prices, cash flow and profitability are problematic for both size operations. For the small-sized operation, positive cash flow is not achieved before debt retirement (after year six) for prices less than $2,000 for 2.5 year old bucks. Positive net present value is not found until a price of $2,531. Similarly, positive cash flow after debt retirement is achieved in mid-sized operations for prices greater than $3,000. Break even ($0 NPV) is found at a sale price of $3,359.

Analysis

The results indicate the need for a high-level of management. Higher-quality bucks will sell for higher prices. To reach profitability, producers must strive for high quality. While not common for small-size farms, artificial insemination of does might be required to reach profitable sale prices. Bucks with larger antlers sell for higher prices. So, semen from proven breeders with high-quality offspring might be advisable.

To increase the likelihood of profitability, aggressive marketing plans must be developed. Finding and developing high-value markets are critical to obtaining high prices. Larger-size operations often develop and operate a hunting enterprise to market their products. Prior to investing in deer farming facilities, it may be prudent to assess the market for farmed whitetail deer in the producer's state. Producers that begin developing markets prior to construction seem more likely to be able to financially survive their first few years, which are high cash demand years.

Further, the management of operating expenses is critical. A ten percent reduction in operating costs reduces the break even sales price for small-size producers by $293 per head and $456 per head for mid-size producers.

One caveat is necessary. The budgets developed here are based on cash flows. So, profits/losses are accounting, not economic. All budgets developed

here assume an opportunity cost of owner's labor of $0 as most small- and mid-size deer farms are managed by part-time operators. If an owner's labor for building and managing a deer farm has a non-zero opportunity cost, the budgets reported here need to be adjusted accordingly. The opportunity cost will vary by owner/operator. No charge for land is included. Most current operators build on land owned prior to construction. If land is purchased for the construction of the deer farm, additional cash flows would also be included in the budget.

In some cases, producers have developed relationships with buyers or have access to exotic animal auctions, so marketing expenses are minimal. However for many producers, non-labor marketing expenses, such as advertising, may be non-trivial.

Finally, the budgets here do not assume sales of other products, including venison and antlers for decorative purposes. Some producers are able to market venison from excess does. While deer produced for antler size may be selected for characteristics other than meat quality and quantity, venison sales might provide additional revenue for some producers of "shooter bucks." Breeding bucks may have antlers sawn off to protect workers and other deer from injury. Taxidermists, novelty furniture makers, and collectors may be willing to pay for antlers, providing another potential source of revenue.

Summary

Deer farming has become an important economic activity throughout much of the U.S. Anderson, Frosch, and Outlaw (2007) reported that U.S. deer farming had a direct impact of $893.5 million on the U.S. economy and a $3.0 billion total impact. Over 29,000 jobs were supported as a result of deer farming. As deer farming does not require large areas, it is most popular with small, part-time, and mid-size farmers. Given a lack of experience and published information, budgeting for the construction and operation of deer farms has not received significant attention in management literature. The information provided here should be useful to owners and managers in developing plans for construction and management of whitetail deer farms.

Results indicate that projected cash flows and net present values are unattractive given baseline scenario assumptions. Negative cash flows for many agricultural investments, including farm land, common. Producers need a plan for supplement sources of cash to carry these project through start up years. At higher product price levels, positive cash flow and net present values are obtained. To improve cash flow and profitability, a high-level of management is required. Breeding programs must emphasize antler size to obtain high sale prices. Management of operating costs is also critical. Sensitivity analyses reveal that a 10 percent cut in annual operating expenses results in an 11.5 percent reduction in the break even sale price for the small-size producer and a 13.8 percent reduction for the mid-size producer. Labor and marketing costs may also be relevant for some operations and should be considered if they are relevant.

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Table 1. Construction Material Prices and Breeding Animal Prices

Item	Price	Useful life
Fencing materials		
300' roll of 8' fence	$425	20+ years
10' T-post and clips	$12/post	20+ years
2 3/8" pipe	$1.80/ft	20+ years
12' entry gate	$225	20+ years
Guillotine gate	$150	20+ years
Feeding and watering		
Water tank	$36	20+ years
Feed trough	$50	20+ years
Breeding animals		
Artificially –inseminated does, small size*	$2,000	7+ years
Artificially –inseminated does, mid size	$6,000	7+ years
Breeding buck—small size	$2,000	7 years
Breeding buck—mid size	$8,000	7 years

*Small and mid size refer size of the operation. It is assumed that the small size breeder purchases breeding deer with a lower or unproven potential for large antler size. The mid size breeder purchases breeding deer with a higher potential for large antler size.

Table 2. Annual Material Lists and Costs for Small-Size Operations

		---Year 1---		---Year 2---		---Year 3---	
Item	Price	Quantity	Total $	Quantity	Total $	Quantity	Total $
Roll (300') 8' fencing	$425	4	$1,700	2	$850	1	$425
10' T-post and clips	$12	60	$720	32	$384	19	$228
Bracing							
12.5' posts and							
braces (2 3/8" pipe)	$1.80/ft	24	$540	21	$473	12	$270
10' cross braces (2							
3/8" pipe)	$1.80/ft	8	$144	10	$180	4	$72
Guillotine gate	$150	2	$300	1	$150	1	$150
Water tank	$36	3	$108	1	$36	2	$72
Feed trough	$50	3	$150	1	$50	2	$100
12' entry gate	$225	3	$675	2	$450	1	$225
Electric fencing							
materials	$150	1	$150	0.33	$50	0.33	$50
Dart gun	$700	1	$700				
Total			$5,187		$2,623		$1,592

Table 3. Material Lists and Costs for Mid-Size Operations

Item		Quantity	Total $
Roll (300') 8' fencing	$425	11	$4,675
10' T-post and clips	$12	180	$2,160
Bracing			
12.5' posts and braces (2 3/8" pipe)	$1.80/ft	48	$1,080
10' cross braces (2 3/8" pipe)	$1.80/ft	16	$288
Guillotine gate	$150	4	$600
Water tank	$36	12	$432
Feed trough	$50	12	$600
12' entry gate	$225	6	$1,350
Electric fencing materials	$300	1	$300
Dart gun	$700	1	$700
Total			$12,185

Table 4. Annual Production Expenses (per head) for Small-Size Operations

Item	Price	---Annually--- Quantity (per hd)	Total $ (per hd)
Alfalfa hay for mature deer	$9/bale	13	$104
Alfalfa hay for doe fawns	$9/bale	8	$64
Alfalfa hay for buck fawns	$9/bale	7	$56
20% protein, 8% fat pellet for mature deer	$0.22/lb	1,533	$337
20% protein, 8% fat pellet for doe fawns	$0.22/lb	126	$28
20% protein, 8% fat pellet for buck fawns	$0.22/lb	540	$119
Milk replacer for doe fawns	$1.60/lb	1.3	$109
Blue tongue + EHD vaccine for mature deer	$2/ml	9	$18
Blue tongue + EHD vaccine for fawns	$2/ml	5	$10
Dewormer pellets for mature deer	$0.48/lb	100	$48
Dewormer pellets for fawns	$0.48/lb	25	$12
Darts for mature deer	$3.20/dart	4	$13
Darts for fawns	$3.20/dart	2	$6
Pneumonia treatments	--	variable	variable
Liming and seeding pens	$100/hd	1	$100
Midge control	$5/hd	1	$5
External parasite control	$0.50	4	$2
Miscellaneous veterinary supplies	$4/hd	1	$4
Total of listed expenses	per hd		$1035

Table 5. Annual Production Expenses (per head) for Mid-Sized Operation

Item	Price	---Annually--- Quantity (per head)	Total $ (per head)
Alfalfa hay for mature deer	$8/bale	13	$104
Alfalfa hay for doe fawns	$8/bale	8	$64
Alfalfa hay for buck fawns	$8/bale	7	$56
20% protein, 8% fat pellet for mature deer	$0.22/lb	1533	$337
20% protein, 8% fat pellet for doe fawns	$0.22/lb	126	$28
20% protein, 8% fat pellet for buck fawns	$0.22/lb	540	$119
38% protein pellet for doe fawns	$0.45/lb	60	$27
38% protein pellet for buck fawns	$0.45/lb	270	$122
Milk replacer for doe fawns	$1.60/lb	109	$175
Calf manna for doe fawns	$0.42/lb	60	$25
Blue tongue + EHD vaccine for mature deer	$2/ml	9	$18
Blue tongue + EHD vaccine for fawns	$2/ml	5	$10
Dewormer pellets for mature deer	$0.48/lb	100	$48
Dewormer pellets for fawns	$0.48/lb	25	$12
Probiotic treatment for fawns	$5/hd	1	$5
Darts for mature deer	$3.20/dart	4	$13
Darts for fawns	$3.20/dart	2	$6
Pneumonia treatments	$1	variable	variable
Liming and seeding pens	$100/hd	1	$100
Midge control	$5/hd	1	$5
External parasite control	$0.50	4	$2
Artificial insemination and semen	$710/hd	1	$710
Miscellaneous veterinary supplies	$4/hd	1	$4
Total of listed expenses	per head		$1,990

Table 6. Investment and Operating Expenses for Small-size Whitetail Deer Farm

Year	Investment[1]	Down Payment[2]	Repairs& insurance	Operating expenses	Principal &Interest[3]
1	$18,187	$7,594	$102	$9,247	$1,658
2	$2,622	$1,311	$164	$18,291	$1,944
3	$1,592	$796	$198	$24,295	$2,118
4			$198	$24,295	$2,118
5			$198	$24,295	$2,118
6			$198	$24,295	$460
7	$2,000		$198	$24,295	$174
8			$198	$24,295	
9			$198	$24,295	
10			$198	$24,295	
11			$198	$24,295	
12			$198	$24,295	
13			$198	$24,295	
14	$2,000		$198	$24,295	
15			$198	$24,295	
16			$198	$24,295	
17			$198	$24,295	
18			$198	$24,295	
19			$198	$24,295	
20			$198	$24,295	

[1]Investment includes facilities, equipment, and breeding stock purchases. Breeding bucks are purchased every seven years.

[2]Assumes 50% down payment on capital purchases.

[3]Assumes five-year amortization and 3% real interest rate.

Table 7. Net Cash Flow and Net Present Value Projections for Small-size Whitetail Deer Farm

	----------Net cash flow with a sale price for 2.5 year old bucks of----------					
Year	$1,500	$1,750	$2,000	$2,250	$2,500	$2,750
1	-$18,601	-$18,601	-$18,601	-$18,601	-$18,601	($18,601)
2	-$21,110	-$21,110	-$21,110	-$21,110	-$21,110	($21,110)
3	-$8,508	-$6,258	-$4,008	-$1,758	$492	$4,992
4	-$7,712	-$5,462	-$3,212	-$962	$1,288	$5,788
5	-$7,712	-$5,462	-$3,212	-$962	$1,288	$5,788
6	-$6,054	-$3,804	-$1,554	$696	$2,946	$7,446
7	-$5,768	-$3,518	-$1,268	$982	$3,232	$7,732
8	-$7,594	-$5,344	-$3,094	-$844	$1,406	$5,906
9	-$5,594	-$3,344	-$1,094	$1,156	$3,406	$7,906
10	-$5,594	-$3,344	-$1,094	$1,156	$3,406	$7,906
11	-$5,594	-$3,344	-$1,094	$1,156	$3,406	$7,906
12	-$5,594	-$3,344	-$1,094	$1,156	$3,406	$7,906
13	-$5,594	-$3,344	-$1,094	$1,156	$3,406	$7,906
14	-$5,594	-$3,344	-$1,094	$1,156	$3,406	$7,906
15	-$7,594	-$5,344	-$3,094	-$844	$1,406	$5,906
16	-$5,594	-$3,344	-$1,094	$1,156	$3,406	$7,906
17	-$5,594	-$3,344	-$1,094	$1,156	$3,406	$7,906
18	-$5,594	-$3,344	-$1,094	$1,156	$3,406	$7,906
19	-$5,594	-$3,344	-$1,094	$1,156	$3,406	$7,906
20	-$5,594	-$3,344	-$1,094	$1,156	$3,406	$7,906
Net present value[1]	-$123,849	-$93,804	-$63,760	-$41,184	-$11,140	$48,948

[1]Assumes a 3% real discount rate.

Table 8. Investment and Operating Expenses for Mid-size Whitetail Deer Farm

Year	Investment[1]	Down Payment[2]	Repairs& insurance	Operating expenses	Principal &Interest[3]
1	$92,185	$46,093	$254	$35,966	$10,065
2			$254	$68,331	$10,065
3			$254	$115,840	$10,065
4			$254	$158,941	$10,065
5			$254	$158,941	$10,065
6			$254	$158,941	
7			$254	$158,941	
8	$8,000		$254	$158,941	
9			$254	$158,941	
10			$254	$158,941	
11			$254	$158,941	
12			$254	$158,941	
13			$254	$158,941	
14			$254	$158,941	
15	$8,000		$254	$158,941	
16			$254	$158,941	
17			$254	$158,941	
18			$254	$158,941	
19			$254	$158,941	
20			$254	$158,941	

[1]Investment includes facilities, equipment, and breeding stock purchases. Breeding bucks are purchased every seven years.

[2]Assumes 50% down payment on capital purchases.

[3]Assumes five-year amortization and 3% real interest rate.

Table 9. Net Cash Flow and Net Present Value Projections for Mid-size Whitetail Deer Farm

	----------Net cash flow with a sale price for 2.5 year old bucks of----------					
Year	$3,000	$3,250	$3,500	$3,750	$4,000	$4,250
1	-$92,377	-$92,377	-$92,377	-$92,377	-$92,377	-$92,377
2	-$78,650	-$78,650	-$78,650	-$78,650	-$78,650	-$78,650
3	-$76,658	-$74,158	-$71,658	-$69,158	-$66,658	-$64,158
4	-$67,259	-$63,009	-$58,759	-$54,509	-$50,259	-$46,009
5	-$31,259	-$24,009	-$16,759	-$9,509	-$2,259	$4,991
6	$8,806	$18,556	$28,306	$38,056	$47,806	$57,556
7	$8,806	$18,556	$28,306	$38,056	$47,806	$57,556
8	$806	$10,556	$20,306	$30,056	$39,806	$49,556
9	$8,806	$18,556	$28,306	$38,056	$47,806	$57,556
10	$8,806	$18,556	$28,306	$38,056	$47,806	$57,556
11	$8,806	$18,556	$28,306	$38,056	$47,806	$57,556
12	$8,806	$18,556	$28,306	$38,056	$47,806	$57,556
13	$8,806	$18,556	$28,306	$38,056	$47,806	$57,556
14	$8,806	$18,556	$28,306	$38,056	$47,806	$57,556
15	$806	$10,556	$20,306	$30,056	$39,806	$49,556
16	$8,806	$18,556	$28,306	$38,056	$47,806	$57,556
17	$8,806	$18,556	$28,306	$38,056	$47,806	$57,556
18	$8,806	$18,556	$28,306	$38,056	$47,806	$57,556
19	$8,806	$18,556	$28,306	$38,056	$47,806	$57,556
20	$8,806	$18,556	$28,306	$38,056	$47,806	$57,556
Net present value[1]	-$230,121	-$69,871	$90,379	$250,629	$410,879	$571,129

[1]Assumes a 3% real discount rate.

Figure 1. Pen, Alley, and Gate Design for Small-Size Operation