Staff Paper

Dairy Farm Decisions on How to Proceed in the Face of TB

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Dairy Farm Decisions on How to Proceed in the Face of TB

by

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Executive Summary

By early 2000, the number of commercial livestock herds in Michigan with tuberculosis (TB) had increased to the point that policy makers were considering alternative ways to enable farmers to stay in business while eliminating TB and protecting the public's health. If at least one animal on a farm is found to have TB, a farmer currently has two choices about the future assuming the goal is to stay in the livestock business. Alternative one is depopulation; all animals are removed to a state facility, slaughtered, and tested. After cleanup, a new herd may be installed one year later. Alternative two is test and remove; a recurring series of testing is initiated, but only individual reactor or suspect animals are removed for slaughter and further testing. In both alternatives, indemnity payments may be made to the owner by the state and by the federal governments.

This paper analyzes the financial impact of each alternative on two dairy benchmark farms. One has 75 milk cows, the other 150. Monthly cash flow projections for two years were made using FINFLO.[2] A base projection was compared to the above alternatives assuming constant herd size (except for the impact of TB) and constant price levels. The main goal was to illustrate how a farmer might analyze the alternatives if faced with TB infected animals.

The 75 cow farm started with $8,309 of cash on January 1, 2000. The base projections resulted in cash of $21,280 by December 31, 2001. Ending cash after two years for depopulation or test and remove were $16,095 and $15,801, respectively. The 75 cow farm started with a net worth of $534,941 on January 1, 2000. The base projection increased net worth by $66,542 over the two years. For depopulation or test and remove, the change in net worth by the end of 2001 was $-15,345 and $48,256, respectively.

The 150 cow farm started with $30,659 of cash on January 1, 2000. The base projections resulted in cash of $40,437 by December 31, 2001. Ending cash after two years for depopulation or test and remove were $2,972 and $13,290, respectively. The 150 cow farm started with a net worth of $929,941 on January 1, 2000. The base projection increased net worth by $31,765 over the two years.

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[2]FINFLO is one of the FINPACK software packages from the Center for Farm Financial Management, University of Minnesota, St. Paul, MN 55108. FINFLO allows multiple year projections of monthly cash flow statements.

For depopulation or test and remove, the change in net worth by the end of 2001 was $-95,911 and $-1,925, respectively.

Benchmark model farms will not exactly fit any particular farm. Each owner faced with TB should make their own projections using their unique situation and timing of cash flows. Once an alternative is adopted, monthly financial comparison sheets can be helpful in managing the transition to TB free status.

Introduction

Michigan has had a developing problem with *Mycobacterium bovis* since 1994 when a hunter killed deer was found to have TB. This discovery started an aggressive risk control strategy to find whether TB was more widely spread, and if so, where.[3] A major effort resulted in the finding of more TB and subsequent loss of TB free status for a zone in northeastern Michigan. Both wildlife and domestic livestock were impacted. By 1998, policy makers were faced with perhaps having to remove TB free status from the whole state.

TB in Michigan's wild deer herd has not died out. This thought to be the only case of sustained TB in a wildlife population in the U.S. The deer are also though to be a vector to spread TB into livestock. To date, positive herd farm herds (livestock tested and found to have TB in one or more animals) have only been found in the northeast corner of Michigan's lower peninsular. However, TB positive deer have been discovered outside the defined zone creating the potential for positive livestock exists.

By early 2000, the number of commercial livestock herds in Michigan with (TB) had increased to the point that state and national policy makers were considering alternative ways to enable farmers to stay in business while eliminating TB and protecting the public's health. At the time of writing (May, 2000), these are the general considerations being discussed. If at least one animal on a farm is found to have TB, a farmer may have at least two choices about the future assuming the goal is to stay in the livestock business.

Alternative one is depopulation. This means all animals are removed to a state facility, slaughtered, and tested. The facilities undergo an approved clean up process. A new herd may be installed one year later. This alternative has become the preferred procedure of scientists who advise policy makers. If all infected farms did this, statewide TB free status could be regained in 3 years, given current regulations.

Alternative two is test and remove. This involves a recurring series of tests with only reactor or suspect animals removed for slaughter and further testing. In the final push to eradicate TB nation wide which started in the 1940's, this was an accepted alternative. A plan has to be agreed upon by governmental authorities and the farmer which may include fencing to prevent contact with wildlife,

[3]P. 3, Michigan Bovine Tuberculosis Activities Report, October 1, 1999, edited by Dr. Nathan Zauel, et al, Michigan Department of Agriculture, 23 pp.

testing protocol, and cleaning of facilities. At any time after this alternative is activated, the farmer may switch to depopulation. If any infected farms choose this alternative, statewide TB free status could be regained in 5 years.

In both alternatives, indemnity payments may be made to the owner by the state and by the federal governments to compensate for the animals taken. In both alternatives, the farm is quarantined as soon as the first animal tests positive, which restricts how livestock and some livestock products are allowed to leave the farm. Quarantine status may remain longer if test and remove is chosen instead of depopulation.

Goals and Methods

The goals are as follows:

1. Illustrate how a dairy farmer with TB infected animals might do a financial analysis to help decide whether to choose the depopulation or the test and remove alternative.
2. Indicate some of the special costs which may have to be considered
3. Show the magnitude of impacts on two farm sizes for each alternative

Two benchmark farms with 75 milk cows and 150 milk cows were created. The 75 cow (total animals milking plus dry) size is the statistical average for the state.[4] The 150 cow size is close to the average size for dairy farms that do business analysis summaries in Telfarm.[5] A few panel farms close to the chosen sizes were summarized as a starting point. None of them were from the TB zone in northeastern Michigan.

Monthly cash flow projections for two years were made using FINFLO. Although any 24 month period could be analyzed, the software works best for a January through December year. To ease interpretation, we chose to think of the time period as the two calendar years of 2000 and 2001. FINFLO was chosen for its ability to project inventories, debts, and nonfarm items as well as operating income and expenses. The financial measures it calculates were judged adequate to isolate the differences between the TB alternatives. Furthermore, FINFLO is a tool readily available should it be needed on individual farms in the future.

FINFLO requires enterprise budgets as a starting point. The summaries of the panel farms were for whole farms not broken out by enterprise. We estimated budgets and then used FINLRB, a long run budgeting software option within FINPACK, to fine tune the budgets. When finished, the whole farm totals of income and variable costs in FINLRB accumulated to the same levels as those in the whole

[4]Michigan Agricultural Statistics, 1998-99, Issued cooperatively by United States Department of Agriculture, National Agricultural Statistics Service, Donald M. Bay, Administrator, and Michigan Department of Agriculture, Executive Office, Dan Wyant, Director.

[5]"1999 Business Analysis Summary for Dairy Farms," Agricultural Economics Staff Paper No. 2000-24 by Sherrill B. Nott

farm summaries. For example, the fuel costs per acre and per cow were set so that total fuel cost in FINLRB results equaled fuel costs for the panel farm summaries. These calibrated budgets served as input to FINFLO. A composite balance sheet for December 31, 1999, from the panel farm summaries served as the starting FINFLO balance sheet.

A monthly base projection was estimated for 2000 and 2001 for each benchmark farm. This base served as a comparison for the two alternatives. Final conclusions were made after examining profit, solvency, and cash flow measures.

Benchmark Descriptions and Common Assumptions

The smaller farm ended 1999 with 75 milk cows, 30 bred heifers and 50 open heifers or calves. Cows were valued at $1,200 per head. Milk sold per cow was 21,600 pounds. Feed crops on hand included corn silage, haylage, hay and corn grain with a total value of $55,600. Valuing assets at market basis, net worth was $534,941 and the debt to asset ratio was 28 percent. Owned and rented acres for crops totaled 360.

The larger farm ended 1999 with 150 milk cows, 50 bred heifers, 100 open heifers or calves and 3 bulls. Cows were valued at $1,200 per head. Milk sold per cow was 21,100 pounds. Feed crops on hand included corn silage, haylage, hay and corn grain with a total value of $89,700. Valuing assets at market basis, net worth was $927,941 and the debt to asset ratio was 21 percent. Owned and rented acres for crops totaled 540.

Performance levels, crop yields, and price levels were held constant at their 1999 levels from the panel farm summaries except as noted here and below. Fuel prices went up noticeably in early 2000, so each enterprise fuel cost was increased 40 percent from calibrated levels.

Table 1:

Jan	15.05
Feb	14.60
Mar	14.50
Apr	13.67
May	13.60
Jun	13.54
Jul	13.52
Aug	14.13
Sep	14.97
Oct	15.67
Nov	15.92
Dec	15.01

Table 1 gives the average of Michigan monthly mail box prices from 1995 through 1999 plus $0.80 for hauling and other supported services. To recognize when payment is actually received, the prices were lagged one month on the FINFLO inputs. Twelve payments were received for each full

calendar year. Animal numbers were held constant except to model the impacts of the TB alternatives; we made no attempt to model the flow of various age replacement heifers into the herd over the projected two years.

When cows were taken by the state, it was assumed indemnity payments were $2,000 per cow and per bred heifer, amounts to be received 6 weeks after cows left the farm. This reflects the state's early practice of paying well above market prices for condemned animals. All other animals were assumed to receive their per head values in the ending balance sheets.

Test and Remove

Common to Both Sizes

This section only applies to those farmers who choose not to buy animals back into their herd. If the indemnity payments are reinvested in replacement cows of equivalent quality and milk production level of the removed animals, there is no need to do this level of analysis. Immediate livestock replacement would leave the operations basically unchanged except for the time and stress spent testing and then purchasing replacements.

Both herd sizes were assumed to have a cow test positive in February, 2000, during the annual screening. The owner would then choose the test and pull option to start in June. At the time of writing, it appears the farm owner may be given some choice about which TB tests will be used during test and remove. Whichever test will be used, we assume it will cause 8 percent loss of milkers during each of the first two tests.[6] Later tests were assumed to find no more TB. It was assumed the herd would not rebuild above TB caused levels until 2003, or beyond the time being analyzed. Table 2 shows the timing and quantities assumed in the analyses.

[6]Future research might include a replacement growth simulation model to stochastically analyze the probability of losing cows test by TB test.

Table 2.	75 Cows # cows	Test Month & Cows Lost	150 Cows # cows	Test Month & Cows Lost
Year 2000				
Jan	75		150	
Feb	75	1	150	2
Mar	74		148	
Apr	74		148	
May	74		148	
Jun	74	6	148	12
Jul	68		136	
Aug	68	5	136	11
Sep	63		125	
Oct	63	0	125	0
Dec	63		125	
Year 2001				
Jan	63	0	125	0
Feb	63		125	
Mar	63	0	125	0
Apr	63		125	
May	63		125	
Jun	63		125	
Jul	63		125	
Aug	63		125	
Sep	63	0	125	0
Oct	63		125	
Dec	63		125	

Regulations for this alternative will likely call for testing every 60 days until a certain number of consecutive tests find no TB. Then the next test can wait for 180 days, until the farm goes back on an annual cycle with the rest of the state. Individuals doing this on their own farms will know the test timing and protocols available to them. Table one shows the test run on June 20 finds 6 milk cows with indications of TB. They are taken by the state, and indemnity is received 6 weeks later, or in August. The zero in October shows a test was made but no TB positive cows were found.

It was assumed each test day cost the smaller farm $100, and the larger farm $200 cash outflow that month. The state will pay the costs of the testing, including the veterinarian(s), and may contribute something towards the farm labor input. However, there will likely be a few extra cash costs the farm will cover, or some loss of milk production that day due to upsetting the cows' normal routine. In the computer runs these are labeled cost of disruptions.

The possibility of growth from within has been ignored. For a farm with enough heifers to enjoy a high discretionary cull rate, the ability to cull less and maintain herd size may exist. But, the odds are that a few heifers will also be found with TB, thus reducing the replacement pool. Also, the longer run

impact of replacements has been ignored. Some of those departing cows in June and August may have been pregnant. This loss of embryos could cause a lack of replacements in middle 2003, after our analysis horizon.

The indemnity payment of $2,000 per cow was split between the inventory value and the indemnity gain on the FINFLO input. This allowed the output to trace the herd inventory change at market levels. To allow accurate tracking in the software, we chose to classify the indemnity pool as an intermediate asset.

Results

The 75 cow benchmark farm started with $8,309 of cash on January 1, 2000. The base projections resulted in cash of $21,280 by December 31, 2001. Ending cash after two years for test and remove was $15,801. The base projection increased net worth by $66,542 over the two years. For test and remove, the change in net worth from January 1, 2000 to the December 31, 2001 was $48,256.

The 150 cow benchmark farm started with $30,659 of cash on January 1, 2000. The base projections resulted in cash of $40,437 by December 31, 2001. Ending cash after two years for test and remove was $12,490. The base projection increased net worth by $31,765 over the two years. For test and remove, the change in net worth from January 1, 2000 to December 31, 2001 was $-2,725.

Depopulate

Common to Both Sizes

The cash flow timings for depopulation are indicated in Table 3.

Table 3

	Year 2000				Year 2001			
	June	July	August	Fall	Spring	June	July	Augus
Herd sold	Cows leave the 30th	$+ Last milk check	$+ Receive cow payment					
Herd expenses		$- Last herd expense						
Facilities cleaned			$- Steam clean					
Cropping				End of harvest $+ crops sold	Crops planted			
Herd purchase						$- Pay for new herd to arrive 30th		$+ F milk ch
Herd expenses							$- First herd expenses	

It was assumed the whole herd was taken by the state after the morning milking the last day of June. The last of the milk would be picked up that afternoon. The indemnity payments for the herd would not be received for 6 weeks, arriving in August. Payment for the June milk would be received in July.

The last variable expenses for the cows during June would be paid in July. Table 4 is the assumed enterprise budget for one cow of the smaller benchmark farm. A budget with similar format was built for the larger farm. It is the cow input budget used in the FINFLO analysis. The milk price was over ridden in FINFLO to use the monthly distribution and average level given in Table 1 for the 2000 and 2001 projections.

Table 4.

Livestock Enterprise	Dairy	
Budget Unit	Per Cow	
Description	Year 2000	
	Long Range	Year 1
Milk		
Quantity (lb.)	21600	-
Price (cwt.)	13.50	-
Product income	2916.00	0.00
Cull income	130.00	-
Miscellaneous income		
Deacons	45.00	-
Gross income	3091.00	0.00
Purchased feed	680.00	-
Breeding fees	25.00	-
Veterinary		
Vet and Med	71.90	-
Lvstk drugs	57.70	-
BST	29.00	-
Livestock supplies		
Livestock	113.00	-
Bedding	15.90	-
DHIA	16.30	-
Fuel & oil		
Fuel	8.20	-
Adjust 2000	3.28	-
Repair, machinery	-	-
Utilities		
Electricity	63.40	-
Hauling and trucking	-	-
Marketing		
Marketing	0.50	-
Milk Haul	115.00	-
Milk Mktg	28.50	-
ADA&PR	22.00	-
Lvstk Mktg	4.00	-
Other direct expense	-	-
Total direct expense	1253.68	0.00
Labor hours	56	-
Corn equivalents (bu.)	165.0	-
Hay equivalents (ton)	7.5	-
Silage equivalents (ton)	6.0	-
Soybeans equiv. (bu.)	-	-
Feed expense	933.00	-
Return over budget expense	904.32	

It was assumed the items from fuel and oil down through other direct expenses would have been delivered and billed in June, but not paid until July. In planning for a depopulation scenario, it is necessary to recognize which costs will be eliminated when the cows are gone, and which will continue to require cash.

By August, 2000, none of the expenses in Table 3 would occur, because all the animals would be gone. The state will likely require an approved clean up plan for the facilities. It was assumed this would be steam cleaning and the direct costs would be paid out in August. It was assumed the state would not require any added fencing costs on the farm. At the time of this writing, there was an expectation that the state would pay for steam cleaning of buildings and facilities, but that the farm would stand the cost of removing contaminated organic matter. This analysis assumes no lost feed inventories due to contamination. Individual farms may have significant inventory losses depending on what the authorities find.

Cash Cropping

It was assumed that a depopulated herd would be allowed to sell all crops produced on the farm. If this option is not allowed, the following analysis would not be applicable. The results of not being allowed to sell crops in the depopulation alternative would be worse than those shown in this analysis. The smaller farm had gross crop sales of $103,200 during 2000 after depopulation. The larger farm had $157,400 of gross crop sales in 2000 after depopulation.

There is some concern that crop prices for products coming out of TB areas may be discounted below those used in this analysis. There could be crop substitution depending upon when in the year depopulation takes place. The range of substitutes depends where the farm is located.

The harvested crops and quantities were left constant at their benchmark 1999 levels for 2000 and 2001. The corn harvested as silage was sold as corn silage. In reality, corn headed for market in October after the herd left in June would likely be harvested and marketed as grain. All hay was priced as dry baled hay. It was assumed the herd would be completely replaced by July 1, 2001. The quantities of feed needed to feed the herd from July 1 until harvest in 2001 were calculated. Any excess quantities not needed to carry over for 2001 feeding were sold after harvest in 2000. Annual crops would be replanted in the spring of 2001 as they had been in 1999 and 2000. It was assumed crop prices received would be $2.10 for corn, $22.00 for corn silage and $70.00 per ton for hay.

Reestablishment of Herd

It was assumed a whole herd with a cross section of age groups would be put into the facilities July 1, 2001. The cash outflow would occur in June, or at least a major down payment. The first variable herd expenses would occur in July. The first milk check would not be received until August due to the standard one month lag. To recognize there would be start up problems,

a 20 percent reduction in milk income was deducted in August, and a 10 percent reduction in September, 2001 compared to the projected base. Any added biosecurity costs were not estimated. Given the experience in many dairy herd expansions where cull rates jump up noticeable right after large numbers of cows are purchased, the assumptions in this analysis may be optimistic.

Assumed cow and bred heifer purchase prices were $1,600 per head. Heifers and bulls were bought back at inventory prices shown at the end of 1999. This means there was no capital gain or loss on open heifers and bulls. However, the cow price is $400 per head less that the indemnity received. The amount was left in FINFLO as an intermediate term asset called 'indemnity gain.' This cash differential is partly responsible for the farms not having to borrow to repurchase herds.

Results

The 75 cow farm started with $8,309 of cash on January 1, 2000. The base projections resulted in cash of $21,280 by December 31, 2001. Ending cash after two years for depopulation was $16,095. The base projection increased net worth by $66,542 over the two years. For depopulation, the change in net worth by the end of 2001 was $-15,345.

The 150 cow farm started with $30,659 of cash on January 1, 2000. The base projections resulted in cash of $40,437 by December 31, 2001. Ending cash after two years for depopulation was $2,972. The base projection increased net worth by $31,765 over the two years. For depopulation, the change in net worth by the end of 2001 was $-95,911.

Discussion

Table 5 gives the financial measures for the base and 2 alternatives for the 75 cow benchmark farm. Table 6 gives the 150 cow results.

Table 5	75 Cows	**Base Projections**	**Depop - ulation**	**Test & Remove**
Year 2000				
	Net farm income	80,582	54,280	73,467
	Change NW	34,452	6,460	28,037
	Ending cash balance	21,280	279,189	26,353
	Term debt coverage ratio	231	133	212
	Debt to asset ratio	22	23	22
Year 2001				
	Net farm income	78,300	19,195	64,949
	Change NW	32,090	(21,805)	20,219
	Ending cash balance	34,230	16,095	15,801
	Term debt coverage ratio	215	26	176
	Debt to asset ratio	19	22	20

Table 6	150 Cows	**Base Projections**	**Depop - ulation**	**Test & Remove**
Year 2000				
	Net farm income	79,149	49,346	64,434
	Change NW	13,899	(18,834)	2,614
	Ending cash balance	34,436	517,199	53,089
	Term debt coverage ratio	170	96	146
	Debt to asset ratio	15	16	15
Year 2001				
	Net farm income	83,256	(19,070)	57,851
	Change NW	17,866	(77,077)	(4,539)
	Ending cash balance	40,437	2,972	13,290
	Term debt coverage ratio	168	(46)	119
	Debt to asset ratio	15	15	13

The base situation is better than either TB alternative, despite the assumption that indemnity payments would be $2,000 per cow while the repurchase price would be $1,600. This surplus was left in the net worth projections without any projected tax penalty. One judgement criteria would be to sum the net worth changes at the end of 2000 and 2001. By this criteria, depopulation leaves both farm sizes worse off choosing depopulation instead of test and remove.

A term debt coverage ratio of 100 or more indicates enough cash inflow to cover all projected cash needs. In both herd sizes, the depopulation alternative indicates inadequate cash by the end of 2001. However, cash needs were met in all cases without adding to total debt by the end of 2001. However, the 150 cow benchmark had to borrow operating money in 2001 during August, September to get the repurchased herd started up. This operating loan was repaid by the end of October, 2001.

The ability to avoid much added borrowing was helped by the federal income tax law pertaining to condemnations. When governmental authorities take assets, federal income tax on payments received can be postponed over a replacement period. This period ends 2 years after the close of the first tax year in which the TB indemnity money would be received. If assets similar to, or related in service, to the property it replaces were purchased, the cost basis of the taken assets becomes the cost basis if the ‘new’ assets. If similar assets are never repurchased,

then any gains become liable for taxation after the postponement period expires. [7] In this analysis, this meant that indemnity payments received went into cash holdings and were available, in effect, where ever needed in the business. This explains a big portion of the 2000 ending cash balance in the depopulation alternative. This cash was assumed to be available to purchase the whole herd in June, 2001.

The method used in creation of the benchmark farms resulted in the 75 cow farm have an operating expense ratio of 61 to 62 percent. The 150 cow farm had an operating expense ratio of 73 to 74 percent. This better cost efficiency helped the smaller benchmark withstand either TB impact relatively better.

Interpretation of results should consider the following. The analysis assumed a constant herd size. A farmer faced with depopulation or test and remove in the middle of a major expansion might have different results than those presented here. The ability to sell crops was important to minimize losses in the depopulation alternative for both size farms. A grazing based system would be expected to have limited alternatives to sell crop production during depopulation, thus incurring losses greater than those in this paper. If current inventory of hay was in round bales stored where inspectors might suspect nibbling from infected deer, those inventories might have to be destroyed, with loss of ability to either feed at a later time or to sell for cash. These potential losses were not considered in the paper.

Conclusions

For either size benchmark, the better alternative way to work out of TB contamination appears to be test and remove. The above analysis indicates individual farmers facing the choice between depopulation or test and remove should spend several hours projecting their own situations to arrive at their preferred alternative.

However, there is a macro view that might argue for requiring depopulation for all. Rules currently being discussed would not allow attaining TB free status state wide until 5 TB free years if test and remove is used. If depopulation is chosen, TB free status might be granted after only 3 years. It might pay society to pay farmers the differential losses implied in Tables 5 and 6 so the whole industry is on clear footing in 2 fewer years. This is worthy of further study.

[7] See the chapter titled “Casualties, Thefts and Condemnations” in the Internal Revenue Services Farmer’s Tax Guide, Publication 225. Look for subheadings on ‘Condemnation,’ ‘Postponing Gain’ and ‘Replacement Period.’ In this analysis, the herd is assumed to be replaced 12 months after being condemned, which is well within the current replacement period rules. However, we assumed the government pays $2,000 for cows that were replaced for $1,600; this $400 gain would probably result in extra capital gains tax not considered this paper.

Appendix

Sensitivity Analysis

The base projections above were done by assuming price levels would stay at recent average levels. To illustrate the sensitivity of the projections to prices, added analyses were done by changing milk and crop prices by plus or minus 10 percent to the levels shown in Table 7.

Table 7 Price Assumptions for Sensitivity Analyses

Item	Lower Price	Base Price	Higher Price
Milk, per cwt.	$13.02	$14.52	$16.02
Corn, per bu.	1.89	2.10	2.31
Hay, per ton	63.00	70.00	77.00
Corn silage, per ton	19.80	22.00	24.20

The milk price is the average for 12 months; in the monthly projections each month had it's own price. Each of the monthly prices were changed by 10 percent in the analyses.

Results are given in Tables 8 through 11 below. Purchased feed costs in the livestock budgets were changed by the same percentage as were the crops. For the test and remove analyses, the lowered feed costs were greater than the reduction in crop sales, causing net farm income to increase on both sizes of farms.

Test and Remove

Table 8	75 Cows	Lower Milk Prices	Lower Crop Prices	Base Projections	Higher Crop Prices	Higher Milk Prices
Year 2000						
	Net farm income	50,559	76,948	73,467	68,993	96,025
	Change NW	6,591	31,208	28,037	23,829	49,222
	Ending cash balance	4,908	29,525	26,353	21,119	47,538
	Term debt coverage ratio	137	223	212	197	285
	Debt to asset ratio	23	22	22	22	21
Year 2001						
	Net farm income	42,902	67,972	64,949	61,925	85,361
	Change NW	(621)	23,056	20,219	17,177	39,196
	Ending cash balance	0	21,810	15,801	7,526	55,963
	Term debt coverage ratio	104	186	176	166	241
	Debt to asset ratio	23	20	20	20	19

Depopulate

Table 9	75 Cows	Lower Milk Prices	Lower Crop Prices	Base Projections	Higher Crop Prices	Higher Milk Prices
Year 2000						
	Net farm income	39,991	46,545	54,280	61,962	68,299
	Change NW	(7,403)	(320)	6,460	13,187	18,979
	Ending cash balance	265,326	272,409	279,189	285,916	291,708
	Term debt coverage ratio	85	110	133	156	176
	Debt to asset ratio	23	23	23	22	22
Year 2001						
	Net farm income	8,965	20,407	19,195	17,906	28,962
	Change NW	(32,035)	(20,593)	(21,805)	(23,094)	(12,038)
	Ending cash balance	0	10,528	16,095	21,533	38,381
	Term debt coverage ratio	(9)	30	26	22	60
	Debt to asset ratio	23	22	22	21	21

Test and Remove

Table 10	150 Cows	Lower Milk Prices	Lower Crop Prices	Base Projections	Higher Crop Prices	Higher Milk Prices
Year 2000						
	Net farm income	22,546	76,593	64,434	56,275	110,322
	Change NW	(37,433)	11,900	2,614	(6,672)	42,661
	Ending cash balance	13,042	62,375	53,089	43,803	93,136
	Term debt coverage ratio	56	167	146	125	236
	Debt to asset ratio	16	15	15	15	15
Year 2001						
	Net farm income	16,925	66,926	57,851	48,776	97,413
	Change NW	(42,559)	3,036	(4,539)	13,429	30,911
	Ending cash balance	500	30,151	13,290	500	88,788
	Term debt coverage ratio	34	136	119	99	198
	Debt to asset ratio	19	13	13	14	13

Depopulate

Table 11	150 Cows	Lower Milk Prices	Lower Crop Prices	Base Projections	Higher Crop Prices	Higher Milk Prices
Year 2000						
	Net farm income	22,039	39,511	49,346	59,150	76,655
	Change NW	(40,440)	(26,735)	(18,834)	(11,168)	2,774
	Ending cash balance	495,592	509,298	517,199	524,865	538,806
	Term debt coverage ratio	48	79	96	114	145
	Debt to asset ratio	16	16	16	15	15
Year 2001						
	Net farm income	(38,935)	(14,046)	(19,070)	(24,129)	3,162
	Change NW	(96,935)	(72,046)	(77,077)	(82,129)	(54,838)
	Ending cash balance	500	500	2,972	5,578	46,811
	Term debt coverage ratio	(90)	(34)	(46)	(57)	4
	Debt to asset ratio	18	15	15	14	14