FIR$T - User Guide Version 2.11

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Introduction to FIR$T and the User Guide

The Feedlot Investment Risk Simulation Tool (FIR$T) analyzes cattle feeding investments. It uses advanced computer simulation techniques to add powerful risk assessment capabilities to traditional break-even and cost of gain calculations. FIR$T was created by Alberta Agriculture and Food and can be downloaded free of charge from Ropin' the Web (www.agriculture.alberta.ca/FIR$T).

How to Use the User Guide (this document)

The User Guide is designed to be used on your computer and in print form. It can be read on-line or downloaded from the FIR$T web page. It is also included in the FIR$T software download. Click on the Table of Contents, use Adobe Reader's search feature to find specific terms, or print a copy for future reference. You may find a print copy valuable for quick access to the average daily gain and dry matter conversion table and other useful information.

Technical Note: To function properly, Adobe Reader must be installed on your computer and the User Guide file (userguide.pdf) must be located in the same folder as the FIR$T program file and its accompanying data files. The FIR$T installation process will manage this task for you.

Adobe Reader has advanced features to help you navigate through the User Guide and to search for specific words and phrases. Open the User Guide and click on the "Bookmarks" tab at the top left of the screen (see Figure 1 below). This reveals the Table of Contents in a separate window, and makes it easier to find your way around the document. Clicking the Search icon helps you find individual topics or phrases.

Figure 1 - Navigating the User Guide (with Adobe Reader)
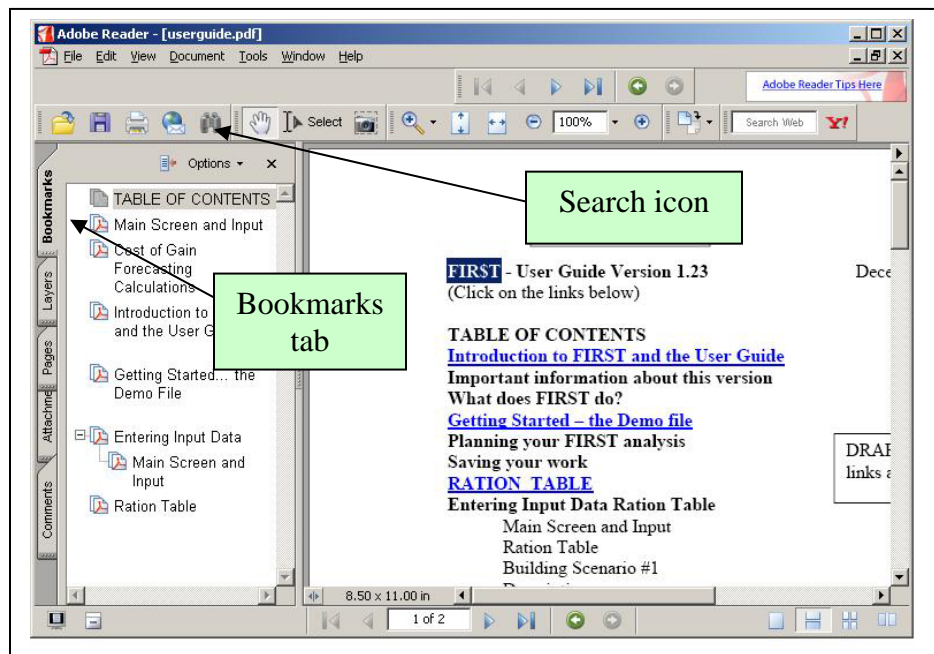
You will also find many hyperlinks or "hot-links" embedded in the text. These links (which show up as blue underlined text) will help you jump to other information in the User Guide or to the Internet. Use the "back" button on Adobe Reader or your Internet browser to return to your original location.

Once you have opened the User Guide, we suggest that you minimize it (instead of closing it) while you are using FIR$T. This approach will ensure that the User Guide is available when you need it.

Important Information about Version 2.11

This version of the User Guide supports FIR$T Version 2.11 which was released in January 2008. Check Ropin' the Web (www.agriculture.alberta.ca/FIR$T) for newer versions or other developments. Several changes and improvements have been made in this version:

- Backgrounding and finishing rations are simpler, more flexible and more intuitive. In version 2.11, barley and silage no longer have dedicated lines in the ration table. This means that any feed grain (barley, corn, wheat, etc.) can be entered in the first line of the ration table (see Figure 2 below).
- Feed grain prices are now entered on the Input Sheet in $ per metric tonne, meaning that bushel weights are no longer required. Feed grain processing cost (on the Input Form) has also been changed to $ per metric tonne.
- The Ration Table is easier to understand since all units are metric tonnes, and ingredient prices are clearly labeled as being on an "as fed" basis.

Using Old Data Files

FIRST Version 2.11 can use data files from the original version, but several one-time adjustments will be required because of the change from bushels to tonnes. *If you fail to make these adjustments, there will be serious errors in your analyses!*

- The input form (lower left side) now reads *Feed Grain Price* (instead of Barley Price), and all prices are per metric tonne (instead of per bushel). Make the appropriate price changes to all scenarios in the analysis.
- On the right side of the input form, under Other Costs, Grain Processing is quoted in $ per metric tonne (instead of $ per bushel). Make the appropriate changes to all scenarios.
- Review the Ration Table. The first ingredient is labeled *Feed Grain*, but you should change this label to reflect your main feed grain. No price change is necessary since Feed Grain prices are set on the Input Form. *The grain processing charge (from the Input Form) is applied to the ingredient on the first line of the Ration Table.* You may also need to re-label the ingredient on the second line, which was fixed as Barley Silage, but is now user-defined. See Figure 2 below. Note that all ingredients are measured in Metric tonnes and all rations are on a dry matter (DM) basis.

Figure 2 - Reviewing the Ration Table

	As Fed Price $/Tonne	% DM
Feed Grain		85.0
Silage	30	45.0
Fin Premix	575	94.4

Downloading and Installing FIR$T

FIR$T is available for download, free of charge from Alberta Agriculture and Food. Follow the instructions in the paragraph above to find the FIR$T web page. This page contains more information about FIR$T, the downloading process and this User Guide. When you're ready to proceed, click on the "Download FIR$T" link near the top of the page. The instructions will lead you through downloading the compressed file which contains the FIR$T program file, the Demo data file and this User Guide. They will also help you create a shortcut to FIR$T on your desktop.

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What Does FIR$T Do?

FIR$T helps feedlot operators and potential investors analyze the risks and returns associated with feeding cattle. If you are a cow-calf producer considering retained ownership in your calves by having them custom fed, FIR$T will be able to help you with that decision. However, use FIR$T with caution if you are feeding your own calves in your own feedlot. For more information, see page 22 - Limitations of FIR$T.

FIR$T relies on your knowledge and understanding of the underlying cattle and feed markets. FIR$T combines all of the inputs, does the calculations and presents an easy-to-read report that shows the expected return as well as the associated risk (the probability of achieving the expected return). For more on risk, see page 23 - Principles.

Unlike most other software, FIR$T recognizes that certain key inputs are not known with certainty at the starting point, or may change over the course of the investment. To allow for this, barley price, US cattle futures price, basis and currency exchange require three different estimates: lowest, most likely and highest. FIR$T uses Monte Carlo simulation techniques to calculate the expected return, as well as the associated risk. FIR$T scenario analysis features a graph that makes it easy to compare the risks and returns for up to six different scenarios.

Getting Started… the FIR$T Demonstration File

 When you open the program, there are two choices: open the Demonstration (Demo) file or start your own analysis. The Demo file is the best way to get a basic understanding of how FIR$T works. Fifteen or 20 minutes spent with the Demo file will help ensure that your initial FIR$T analysis will be a success.

Opening the Demo File

From the Welcome Screen, click on Start to get to FIR$T's Main Screen. Click on the "Open" button to display the available data files, and choose the Demo file.
> *Technical Note:* If the Demo file cannot be found, check that the FIR$T2.11.exe file is in a file folder with the Demo file and the User Guide file (userguide.pdf).

The first three columns of the Main screen should now have numbers in them. This screen displays input data for all scenarios. "Left click" on one of the columns to get the Input Screen specifically for that column. This is where you enter or edit all input data.

"Right clicking" on any column on the Main screen gives you two choices (see Figure #3 below):
- Clear all inputs from that column, or
- Copy inputs from another column into the current column. This option is very useful when comparing similar scenarios, because you don't have to enter inputs twice.

Figure 3 - "Right Click" to Copy from One Column to Another

"Right click" on any blank Main Screen column to copy the contents from any other column.

"Right Clicking" also allows you to clear individual columns.

If you leave the Input Screen by clicking "Close," the screen closes without running the simulation. If you click "Run Simulation" or the "X" at the top right of the screen, FIR$T calculates the results for the current scenario and displays them on the Scenario Analysis screen. Using the same process, run simulations for the other two demo scenarios and take a look at the results.

This Demo file reflects three different feeding opportunities:
- **Scenario 1 (Calves Pasture)** – light calves purchased in November, pastured the next summer, then fed to finished weights by the next November.
- **Scenario 2 (Calves Background)** – the same light calves but fed more aggressively, and finished by the next October.
- **Scenario 3 (Yearlings)** – a completely different investment in heavy feeders, purchased in November and fed to slaughter weights by March.

To learn more, see page 18 - "Scenario Analysis - Interpreting FIR$T Tables & Graphs".

Saving your Work – Managing FIR$T Data Files

Before you start, it is important to understand how FIR$T saves and manages data files. Icons on the Main page allow you to Save or Open data files. FIR$T data files use the file extension "ffd" (for example, analysis 1.ffd).

Information in the Ration Table is automatically saved each time you save your work. This is important because once you modify the Ration Table to suit your situation, you'll likely want to use the same rations again in the future. One approach is to save a special ration table template data file; another would be to start each new analysis by loading an earlier file, clearing all of the scenarios and saving the file under a new name. For more information, see page 6 - Ration Table section.

Planning your FIR$T Analysis

A successful FIR$T analysis depends on your knowledge and experience in cattle feeding and marketing. FIR$T does the calculations, but you provide the inputs. Potential sources of information include:

- Current cattle prices (personal knowledge, auction sales, cattle buyers, etc.).
- Prices in the future (U.S. cattle futures, basis, currency exchange, barley). Note the Internet links at the upper right of FIR$T's Input Form.
- Quotes from a custom feeder on yardage, medical, grain processing, bedding and other costs.
- Ration information, based on your own expertise or information from a nutritionist or custom feeder.
- Dry matter conversion and average daily gain on page 12 - guideline tables - of this User Guide.

Entering Input Data

Welcome, Main and Input Screens
Once you're familiar with FIR$T's features, start your analysis by closing FIR$T and opening it again. This ensures that no inputs or outputs remain from previous analyses, but remember that the Ration Table will revert to the original default. If you have saved a data file that contains your own rations, use it instead. FIR$T has only two input screens and one output screen. After the Welcome screen, you'll see the Main screen. It shows a summary of inputs for all scenarios (1 to 6). To see the Input Form for a specific scenario, click anywhere in that column and the Input Form for that scenario will pop up.

Ration Table
To go to the Ration Table, click on the icon on the left side of the Main Screen (the Ration Table will also pop up if you click on the Scenario 1 column when it has no data. This is to remind you to enter your own dry matter ration formulations and associated commodity prices). Once you have modified or added at least one backgrounding and one finishing ration, the screen can be closed. Your ration information will be saved with the data file, and can be changed at any point in the future. Help with setting up appropriate rations is shown on page 9 - in the Ration Specification section.

Building Scenario One
Once you have set the rations and fixed commodity prices, you can start to create the first scenario. A scenario is the expected performance of one animal that represents the average of a lot or pen. The first step is to describe the scenario.

Description
Make up your own abbreviated code to describe the animals being simulated for future reference. Enter the code or abbreviation into the description box at the top of the scenario column. For example: #1-450-S-BPF may represent first cut 450 lb steers to be backgrounded, pastured and then finished. The description is totally up to you.

Purchase Weight and Price
For cattle that have yet to be purchased, you can reference CanFax, weekly auction market reports or consult with trusted order buyers that have a feel for various cattle quality and price relationships. In general, published prices and market reports should be used as initial numbers only, since market volume and cattle quality are generally not quoted.

Days on Feed
The number of days on feed operates in conjunction with average daily gain (ADG) to determine ending dates and ending weights. In setting days on feed, pay special attention to ensure that backgrounded cattle get out to grass on time and finished cattle reach their expected market weights. Changes in "end" weights and "out" dates can be observed on the Input Form by changing days on feed and average daily gain.

Dry Matter Conversion
Enter the expected dry matter feed conversion (feed-to-gain ratio) here for backgrounding and finishing phases. If you are not confident in your knowledge of feed conversion capabilities, check the information and recommended guidelines on page 11 - in the Predicting Dry Matter Conversion and Average Daily Gain section.

Average Daily Gain (ADG)
Next enter ADG, paying special attention to the resulting calculated ending dates and ending weights. ADG estimates should be consistent with dry matter (DM) conversion ratios entered in the previous box. In general, lower average daily gains will coincide with high feed-to-gain ratios.

Death Loss
Enter expected death loss percentages in the corresponding boxes for each of the three possible feeding phases. Death loss calculations in FIR$T reduce the amount of expected cattle sales revenue by the percentage estimate. As well, feed and other costs are adjusted for the portion of the time dead animals were on feed. You will notice an increasing cost per lb of gain as death loss percentages are increased. This is a result of feed and other costs associated with the dead animals being charged to living animals that are actually sold. Note that Expected Profit per head (reported on page 18 in the Scenario Analysis table) is reported in $ per head sold. For more information, see page 22 below - Terms/Definitions/Standards.

End Date and End Weight
These are automatically calculated values based on the date in, purchase weight, average daily gain and days on feed.

Other Costs

Before going on to enter values and price ranges for grain and cattle, enter expected values for other costs on the right hand side of the Input Form. Other costs include yardage, bedding, medical, grain processing, pasture rent, and freight (to and from pasture). Complete definitions and interpretations are listed on page 8 - in the <u>Cost of Gain Forecasting Calculations</u>.

Price Ranges

When all of the cost estimates have been entered, concentrate on researching market opinions on the key drivers for barley price, Canadian selling price (if selected), U.S. cattle futures, basis, and exchange rate. With this knowledge, you can then enter your expectations of price ranges for these inputs. For detailed definitions and recommendations, go to page 13 - <u>Price Ranges - Forecasting and Data Entry</u>.

Run Simulation

When all of the production information and cost data for the current scenario has been entered, press the "Run Simulation" button at the top of the Input Form. After the simulation has run, results can be read and interpreted. A complete discussion of analyzing results is contained later in this document on page 18 - <u>Scenario Analysis - Interpreting FIR$T Tables and Graphs</u>.

> *Special Note:* Before spending a lot of time on initial results, first look at expected cost of gain and breakeven levels. An assessment of these initial results may shed light on possible data entry errors. However, you should not expect the cost of gain values to reflect coffee shop talk or some feedlot estimates. The FIR$T program includes all costs and does not necessarily have the optimism that that some custom feedlot quotes *may* contain.

Cost of Gain Forecasting Calculations

Definitions

FIR$T helps you to forecast cost of gain (COG) based on your own experience and management. In this program, COG is partly determined by the animal's feed-to-gain ratio, expressed as dry matter (DM) conversion. Dry matter conversion ratios typically range from 5 to 12 lbs of DM per lb of gain. An ultimate objective of many feedlots is to achieve the elusive 5 by 5 result: that being 5.0:1 DM conversion and 5 lbs average daily gain (ADG). The main determinants of COG are:

- **Dry Matter (DM) Conversion** – the number of pounds of feed it takes to put on a pound of gain.
- **Average Daily Gain (ADG)** – how fast the gain is put on. The faster an animal gains, the less overhead or yardage charges are incurred per lb gained.
- **Yardage** – is a catchall term that represents commercial feedlot charges. It is important that a feedlot customer get as much clarification as possible about what is included in yardage charges. In some cases, yardage may include items like bedding, medical, feed mark-up, and grain processing.
- **Bedding** – This is an estimate of the amount that a feedlot will charge for delivering bedding to the cattle. Some feedlots may include this cost in their yardage charges, so it is important not to "double count."

- **Medical** – This is the estimated cost of induction and other animal health-related products and services in a custom feedlot setting.
- **Grain Processing** – This a catchall term for the difference between the quoted market price for feed grain and the price per tonne delivered to the feed bunk. It can include brokerage fees, rolling, shrinkage and feed mark-up. Some custom feedlots have this number built into their yardage charges; however, it is a real economic cost to the cattle investor. Due to programming complications, FIR$T calculates grain processing costs only on the primary feed grain (as listed on the Input Form, and the first ingredient in the ration table).

    > *On-farm feeding:* because of the farm-to-farm variability in cost elements such as yardage, it is not recommended that FIR$T be used to evaluate feeding in these situations. See below - Additional Notes on Yardage.

Pasture Growing

For scenarios that include a pasture phase, FIR$T requires inputs for:

- **Pasture Rent** – the fair market value paid to, or allocated to, the pasture owner. This is expressed in $ per head per month.
- **Freight** – The $ per head required to move cattle to pasture, then back to the feedlot for finishing.
- **Medical** – The amount of veterinary and medical expenses (per head) required get the cattle through the pasture period.

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Additional Notes on Yardage

Yardage is an easy number determine for investors placing cattle into a custom feedlot. However, investors must do their due diligence to ensure that there are no hidden costs or profit margins built into a feedlot's billing system that might cause "double billing." Reviewing past actual closeouts and comparing them with FIR$T results will ultimately reveal the transparency of the feedlot's system. The commercial feedlot's billing system will determine what yardage, medical and grain processing margins to use in FIR$T input screens.

> *On-farm feeding:* The accuracy of your FIR$T analysis may benefit from a review of your historical financial records with respect to your fixed and variable costs. Accurate yardage estimates require the allocation of capital and variable costs to the feedlot enterprise. When a feedlot's fill rate varies, the capital cost allocated to each animal also varies. As well, costs considered as "variable" such as labour, utilities and repairs may not vary proportionately with the number of head of cattle in the feedlot. For these reasons, FIR$T is not recommended for use in assessing cattle feeding scenarios on your own farm. The publication Yardage – The Cost Beyond Feed contains further interpretation and explanation of estimating yardage. It is available on Ropin' the Web by clicking on the link above or using Search to find the title. You may also wish to refer to page 22 - Limitations of the FIR$T Program of this User Guide.

Ration Specification

FIR$T uses *one* ration for calculating feed costs in each production phase. Select one ration for backgrounding and another ration for finishing. Ration selections are made from the drop-down

menus on the Input Form in the Other Costs section. The Ration Table contains eight feasible rations that can be used for comparison purposes (four backgrounding and four finishing). All of these rations can be modified or completely replaced by typing in your own information. *It is important to note that* **FIR$T** *is not a least cost-ration program.*

It is also very important that you consult with your nutritionist or custom feedlot manager to define feasible ration formulations. Reviewing historical lot closeout records will also reveal the average ration compositions for various types of cattle.

Average Ration Calculations
The default rations in the table are not step-up rations; they are the average ration composition for that specific feeding period. For example: if the last ration on a finishing program was 85% barley and 15% silage, the ration used in the FIR$T program would need to be slightly lower in barley content due to the step-up process. Thus, a weighted average ration must be calculated or estimated. This can be easily done by your nutritionist or with a simple spreadsheet.

> *General rule of thumb*: Take the final ration's percentage of grain and back it off by 5 to 6% to obtain the approximate average grain content. For example: if the final ration contains 90% grain, the average over the feeding period will be about 84.5 to 85.5%.

Fixed (Non-Varying) Feed Price Inputs
Except for the primary Feed Grain, all of the feed or commodity prices used in FIR$T are entered as single point estimates. The three-point estimate for Feed Grain is entered on each scenario's Input Form. All other feed input prices are entered on the Ration Table page. This table appears when you start a new analysis or when the icon is clicked on the Main page. Ration Table price inputs include:

- **Feed Grain** – the first ingredient in the ration table is labeled as "Feed Grain," but you can change this to be more specific. In most rations, this would be barley, corn, or perhaps wheat. This ingredient in the ration table is unique because Grain Processing costs ($/Tonne) are applied only to the ingredient represented on the first line. Enter Grain Processing costs on the Input Form for each scenario.
- **Seven other Commodities** – FIR$T allows the use of up to six other ration components that must be specified by the user. The only condition is that the commodity price must be expressed in dollars per metric tonne.
   > **Special Note -** Remember that the user is responsible for adjusting cattle performance expectations (ADG and DM conversion) when rations and ration ingredients are changed. FIR$T cannot make this adjustment automatically.

Dry Matter Calculations
Since moisture levels can vary significantly it is important that all rations be expressed in dry matter terms. If you don't know the dry matter composition of a ration but you do know the average lbs per head per day of each ingredient fed, the conversion to percent dry matter can be done easily by a nutritionist or by using a spreadsheet.

> *Management Note:* A good management practice is to take weekly tests of silage and grain moisture levels so that as-fed ration formulations used by the feed truck driver or mill manager are accurate and consistent with the feeding program.

Predicting Dry Matter (DM) Conversion and Average Daily Gain (ADG)
Errors in predicting performance represent a large part of the production risk associated with cattle feeding. Making more accurate predictions will effectively minimize the amount of production risk. Although every attempt should be made to minimize prediction errors, it should be understood that adverse weather and human error could affect the final results.

- **Using Historical Data -** The best way predict future conversions and daily gains is to review historical closeout records for similar types of cattle. With a large number of closeouts, an average conversion and ADG can be calculated. By reviewing historical records, investors will also get a feel for the amount of variability around the calculated averages.
- **Nutritionist Assistance -** Many beef nutritionists have first-hand knowledge of the ADG and DM conversions that a feeder can expect given the feeder's unique systems and type of cattle.
- **General Guidelines -** In the absence of significant historical records or timely nutritionist advice, Table 1 below can provide a reasonable estimate of the dry matter conversions that a feeder can expect to see. In general, dry matter conversions increase when rates of gain decrease, and vice versa. As such, Table 1 shown below contains a range of ADG levels from which to draw corresponding conversion figures. Cattle with better feed-converting traits will exhibit better results, while poorer cattle will not achieve the conversion in the table given a specific rate of gain. The Table 1 below represents observations in the industry for various generalized feeding programs. This table should be used as a guide only.
- The general guideline Table 1 below is for *steers only*. These estimates must be adjusted down by approximately 10% for equivalent quality heifers. In some cases and under less than optimal conditions, feed conversion and average daily gain results may approach a 12 to 15% difference from steers.

Table 1 - ADG and DM Conversion Guidelines

Steers Only [1] (see paragraph above for information about adjusting for heifers)

Finishing Yearlings Off Grass – 875 lbs going to 1410 lbs										
Average Daily Gain	3.0	3.2	3.4	3.6	3.8	4.0	4.2	4.4	4.6	4.8	5.0
D.M. Conversion	6.9	6.6	6.4	6.1	5.9	5.7	5.5	5.4	5.2	5.1	5.0
Finishing Yearlings – Backgrounded – 850 lbs going to 1350 lbs											
Average Daily Gain	3.0	3.2	3.4	3.6	3.8	4.0	4.2	4.4	4.6	4.8	5.0
D.M. Conversion	7.3	7.0	6.7	6.5	6.3	6.1	5.9	5.7	5.6	5.4	5.3
Finishing Heavy Weaned Steer Calves – 650 lbs going to 1275 lbs											
Average Daily Gain	2.2	2.4	2.6	2.8	3.0	3.2	3.4	3.6	3.8	4.0	4.2
D.M. Conversion	7.3	6.9	6.6	6.3	6.1	5.9	5.7	5.6	5.4	5.3	5.2
Finishing Medium Weight Weaned Calves – 550 lbs finished at 1325 lbs											
Average Daily Gain	2.0	2.2	2.4	2.6	2.8	3.0	3.2	3.4	3.6	3.8	4.0
D.M. Conversion	6.7	6.4	6.1	5.8	5.6	5.5	5.3	5.2	5.1	5.0	4.9
Backgrounding Light Calves – 400 lbs growing to 600 lbs											
Average Daily Gain	1.0	1.2	1.4	1.6	1.8	2.0	2.2	2.4	2.6	2.8	3.0
D.M. Conversion	12.1	10.7	9.7	8.9	8.3	7.8	7.4	7.1	6.8	6.6	6.4
Backgrounding Heavy Calves – 550 lbs growing to 850 lbs											
Average Daily Gain	1.0	1.2	1.4	1.6	1.8	2.0	2.2	2.4	2.6	2.8	3.0
D.M. Conversion	16.2	14.0	12.5	11.3	10.4	9.7	9.1	8.6	8.2	7.8	7.5

Resources for Further Assistance
- **Qualified Nutritionists** – are available through local feed suppliers and feedlot consultants.
- **Alberta Agriculture and Food's CowBytes Ration Balancing Program** – gives an easy to use and reasonable prediction of cattle performance on user-developed rations. Some cattle feeders feel that this program may be somewhat conservative in its performance predictions. Search for CowBytes on Ropin' the Web (www.agriculture.alberta.ca).
- **Alberta Agriculture and Food (AF) Economics and Competitiveness Division** has compiled some historical dry matter intake and rate of gain information. The article "Drylot Backgrounding of Feeder Cattle" provides information on rate of gain and feed

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[1] Assistance in reviewing and revising this table was provided by Dave Steadman, Nutritionist, Landmark Feeds, Strathmore, Alberta.

conversion economic influences. It is available on Ropin' the Web (www.agriculture.alberta.ca) by clicking on the link above or using Search to find the title.

- **Beef Improvement Ontario's** article by Susan Armstrong, **"**Feed Efficiency: are you prepared to cash in?" gives a brief description of the importance of dry matter feed conversion. It is available from their website at: www.biobeef.com/TechCorner/FeedEfficiencyFactSheet.htm

Price Ranges - Forecasting and Data Entry

FIR$T requires you to enter three-point estimates for several key input and return factors. The general format is: "highest", "most likely" and "lowest." For your estimates of "highest" and "lowest", try repeating this statement to yourself, "I'd be very surprised if the price were higher (or lower) than …". From these three price inputs, FIR$T calculates statistical distributions and return probabilities. For more on this topic, see page 24 - Framing your responses.

Canadian Selling Price Method
This selling price range is required only when you choose not to use the Futures-Basis-Currency forecasting method. This option can be selected on the Input Form by clicking the Canadian Price button in the Choose Price box. When this alternative is selected, the Cattle Futures, Cattle Basis and Currency entry points are disabled.

- **Canadian Price** – Enter your prediction for the "highest", "most likely" and "lowest" prices (in $CDN) for finished cattle at an appropriate future date.
- **Feed Grain Prices –** Enter your estimates for the "highest", "most likely" and "lowest" prices on the Input Form for each scenario. Note that the Feed Grain prices you are predicting are weighted average prices over the entire feeding period, and are entered in $/Tonne. Remember that Feed Grain refers to the ingredient on the first line of the Ration Table, and that Grain Processing costs apply only to that ingredient.

Futures Price Method
This price-forecasting alternative is selected by clicking the Futures Price option in the Choose Price box. Clicking this button will disable the Canadian Price entry and enable the Cattle Futures, Cattle Basis and Currency entry points.

- **Cattle Futures** - Futures price selection requires predictions for the "highest", "most likely", and "lowest" values for US cattle futures (in $US/lb).
- **Cattle Basis** – Enter your predictions for the "weakest", "most likely" and "strongest" basis levels (in $CDN/lb). Note that basis is usually a negative number, and is entered using a minus sign.
- **Currency** – Enter your exchange rate predictions for the "highest", "most likely" and "lowest" values (in $US per $CDN).
- **Feed Grain Prices –** Enter your estimates for the "highest", "most likely" and "lowest" prices on the Input Form for each scenario. Note that the Feed Grain prices you are predicting are weighted average prices over the entire feeding

period, and are entered in $/Tonne. Remember that Feed Grain refers to the ingredient on the first line of the Ration Table, and that Grain Processing costs apply only to that ingredient.

Information Sources

Input values for Feed Grain, Cattle Futures, Cattle Basis, Currency, and Canadian Price reflect your best estimates of what prices will be at the time of sale. For more information, see page 20 - Evaluating Risk Management Strategies.

These prices can be estimated using publicly available cash, futures and basis information. We strongly recommend that you consult with reputable market analysts, and look at current and historical price data in determining appropriate forecasts. Good sources of information include:
- CanFax,
- Alberta Agriculture and Food (AF) market analysis information,
- Major grain companies,
- Cattle and grain brokerage service providers,
- Historical futures price charts from various free Internet sources,
- Current U.S. futures prices from The Chicago Mercantile Exchange (CME). See Internet links provided on FIR$T's Input Form.

In addition to these sources, Table 2 on page 17 provides Cattle Basis information. Analyzing trends and seasonality of price moves can add accuracy to the price prediction process.

Determining Input Values

This section suggests a reasonable system for determining realistic input values. However, you are totally free to use whatever prediction system you feel is appropriate. In general, the more confident you are in your predictions, the lower the risk in the cattle feeding venture.

Feed Grain Price

This is the price of your primary feed grain FOB the feedlot. Remember that you are trying to forecast the weighted average price for the feeding period.
- **"Most Likely" -** This should reflect the price that a feedlot can book grain into the lot for future use in the specific feeding period.
- **"Highest" –** This is your expectation of a possible worst-case scenario as determined from trends, historical data, or other sources.
- **"Lowest" –** This is your expectation of a possible best-case scenario as determined from trends, historical data, or other sources.

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Canadian Cattle Selling Price
Remember that this information is required only when using the Canadian Price method, as selected on the Input Form.
- **"Most Likely"** – Many cattle feeders think of this price as the current cattle price. However, seasonal adjustments to the current price should be made using seasonal trends available from various market analysts. This is the price you expect to get when the cattle are sold.
- **"Highest" and "Lowest"** – These prices are often made by "gut feel" or through consultation with trusted analysts. **Note**: Historical trend data must be used with caution due to large impacts that trending exchange rates can have on the Canadian price.

Cattle Futures Price
This is the Chicago Mercantile Exchange (CME) futures price that you expect to see at the end of the feeding period. Contract months must be consistent with the End Date calculated on the Input Form. For end dates without a futures contract month, the next available contract month should be used.
- **"Most Likely"** – Academic research has shown that the best prediction of price is the current futures market price for the contract month in question. Thus, the best prediction for the futures price is the current market quote for the futures month in question. Current market quotes are available from a variety of sources including the link to the CME on FIR$T's Input Form.
- **"Highest" and "Lowest"** – These prices can be estimated by looking at long-term monthly charts as well as seasonal charts. As well, there are expert analysts providing fundamental supply and demand analysis services that can be useful. Other service providers can suggest a more technical or chart-derived forecast based on current trends and similar past years.

Canadian Dollar Exchange Rate
- **"Most Likely"** – Like the Cattle Futures Price, academic research has shown that the best predictor of exchange rates is the current futures market quote for the appropriate contract month. Current futures market quotes are available from a variety of sources including the Internet link to the CME on the Input Form.
- **"Highest" and "Lowest"** – Like cattle futures, these prices can be estimated by looking at long-term monthly charts. As well, there are expert analysts providing fundamental analysis services that can be useful. Most major banks can provide assistance in determining these parameters.

Basis
Of all the variables used in FIR$T, basis is likely the most difficult to predict. Since the BSE market failure in 2003, new assumptions must be made about basis levels. However, traditional supply and demand relationships and seasonal tendencies seem to be operating once again. In general, basis has weakened by about $0.02 to $0.03 per lb since 2003.

- **Basis Definition**[2] **-** Basis is defined as the Canadian Cash Market Price minus the Futures price, expressed in $CDN. Canadian Cash price is then equal to Basis plus Futures in $CDN.

For the most part, basis is a negative number, with larger or more-negative numbers indicating a *weak basis*. A smaller negative basis number represents a *strong basis*. For example, a basis of -$.025 (minus two and half cents per lb) is a relatively strong basis and a basis of –$0.195 (minus nineteen and a half cents per pound) is a relatively weak basis.

Changes in the Basis can be described as follows[3]**:**
Basis is *stronger* if:
- Cash prices increase and futures market prices remain unchanged.
- Cash prices remain unchanged and futures market prices decline.
- Cash prices increase and futures market prices decrease.
- Cash prices increase more than futures market prices increase.
- Cash prices decrease less than futures market prices decrease.

Basis *weakens* if …
- Cash prices decrease and futures market prices remain unchanged.
- Cash prices remain unchanged and futures market prices increase.
- Cash prices decrease and futures market prices increase.
- Cash prices decrease more than futures market prices decrease.
- Cash prices increase less than futures market prices increase.

Basis Guidelines
Basis information can be obtained from a variety of sources including brokerage firms, private analysts, and Alberta Agriculture and Food (AF) market analysis sources. The guidelines presented in this section are directly from CanFax. In Table 2 below, basis predictions are derived from the average of the 5 years prior to BSE. The averages for each month were then adjusted upward by $0.03 per lb. The averages were then adjusted up and down by 3 times the standard deviation to represent reasonable strongest and weakest scenarios.

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[2] This definition may appear to be incorrect; however, it reflects recent changes and efforts to conform to US definitions. In the past, basis (in Canada) was often defined as futures *minus* cash, which usually produced a positive number. Most cattle marketing organizations and other authorities (including CanFax) now agree that basis is best defined as cash *minus* futures. This means that basis for Canadian cattle feeders is almost always a negative amount.

[3] Division of Agricultural Sciences and Natural Resources • Oklahoma State University, F-579, Oklahoma Cooperative Extension Fact Sheets

Table 2 - Basis Guidelines
Steers Only (see information about <u>heifers</u> below)

Fed Steer - Basis ($ per lb.)
Alberta (Cash minus Futures)
Source: Canfax

	JAN	FEB	MAR	APR	MAY	JUN	JUL	AUG	SEP	OCT	NOV	DEC
1994	-0.057	-0.079	-0.086	-0.099	-0.071	-0.083	-0.102	-0.131	-0.141	-0.098	-0.068	-0.085
1995	-0.101	-0.104	-0.093	-0.080	-0.033	-0.056	-0.058	-0.078	-0.096	-0.093	-0.088	-0.105
1996	-0.098	-0.125	-0.111	-0.088	-0.098	-0.129	-0.131	-0.109	-0.126	-0.074	-0.041	-0.116
1997	-0.075	-0.057	-0.060	-0.069	-0.052	-0.062	-0.077	-0.094	-0.144	-0.094	-0.071	-0.096
1998	-0.092	-0.073	-0.086	-0.091	-0.094	-0.111	-0.127	-0.118	-0.136	-0.132	-0.085	-0.054
1999	-0.045	-0.078	-0.109	-0.095	-0.031	-0.096	-0.103	-0.098	-0.121	-0.147	-0.068	-0.025
2000	-0.066	-0.085	-0.059	-0.075	-0.058	-0.084	-0.095	-0.064	-0.126	-0.134	-0.123	-0.093
2001	-0.105	-0.098	-0.059	-0.094	-0.064	-0.129	-0.139	-0.143	-0.164	-0.108	-0.081	-0.046
2002	-0.091	-0.106	-0.039	-0.081	-0.020	-0.060	-0.113	-0.096	-0.141	-0.103	-0.141	-0.108
2003	-0.102	-0.059	-0.005	-0.050	-0.017	-0.367	-0.662	-0.705	-0.448	-0.480	-0.459	-0.356
2004	-0.191	-0.229	-0.210	-0.282	-0.374	-0.478	-0.437	-0.445	-0.305	-0.283	-0.205	-0.225
2005	-0.265	-0.220	-0.265	-0.328	-0.283	-0.220	-0.120	-0.129	-0.167	-0.203	-0.157	-0.133
2006	-0.166	-0.164	-0.093	-0.052	-0.006	-0.037	-0.101	-0.129	-0.159	-0.159		
Max	-0.045	-0.057	-0.039	-0.069	-0.020	-0.056	-0.058	-0.064	-0.096	-0.074	-0.041	-0.025
5 yr avg (98-02)	-0.080	-0.088	-0.070	-0.087	-0.053	-0.096	-0.116	-0.104	-0.138	-0.125	-0.100	-0.065
Min	-0.105	-0.125	-0.111	-0.099	-0.098	-0.129	-0.139	-0.143	-0.164	-0.147	-0.141	-0.116
Suggested Initial Values												
avg+ mean Adj (Strongest)	-0.070	-0.082	-0.064	-0.094	-0.045	-0.081	-0.083	-0.089	-0.121	-0.099	-0.066	-0.050
5 yr avg adjusted (Most Likely)	-0.105	-0.113	-0.095	-0.112	-0.078	-0.121	-0.141	-0.129	-0.163	-0.150	-0.125	-0.090
avg - adj X factor (Weakest)	-0.155	-0.163	-0.145	-0.162	-0.128	-0.171	-0.191	-0.179	-0.213	-0.200	-0.175	-0.140

The numbers in Table 2 are meant as guidelines only; as history has shown, almost anything is possible. However, some producers feel that even though the basis may collapse due to some unknown risk, government programs (including CAISP) may limit the net effective basis resulting from the event.

> ***Special Note About Heifers****:* The basis table (Table 2) and suggested values are for steers only. In many cases heifers will sell at a discount to steers due to their generally lower carcass yield. However, there are times when heifers sell at par or premium to steers due to their more desirable grades and carcass weights. Further research and basis refinement by the feeder is suggested before making estimates. Under ***no*** circumstances should the above table be applied to heiferettes.

Interest Rate
This is the average interest rate that an investor would expect to pay on the debt portion of the feeder animal and the feed that the animal eats. FIR$T calculates expected interest costs on the debt level specified as 100% minus the equity level (as defined in the next paragraph).

Equity Level
The equity level is the percentage of equity that an investor or cattle owner provides to a lending institution or feedlot to finance both the feed and the feeder animal. Typically this figure would represent the margin requirement for a revolving operating loan. For custom feedlot or other financing programs that require a set $ per head security deposit, the percent equity must be calculated as the security deposit divided by the total expected cost of the cattle, feed and all production costs.

Special Note - Feeder Associations:

- **No Line of Credit -** The feeder association equity deposit of 5% of the value of the cattle must be added to 100% of the expected feed cost before dividing the total by the cattle and production costs to get the percent equity number.
- **Bank Operating Line Secured by Feed -** Caution is warranted in that some producers may feed their cattle with feed already securing an operating line of credit with a bank. In this case, the equity level would be the security deposit plus the bank's margined percentage of the feed and production costs, divided by the total of the cattle and production costs. This results in a lower equity level, higher interest costs and higher financial risk.

Scenario Analysis - Interpreting FIR$T Tables and Graphs

FIR$T's main output report is the Scenario Analysis screen (which can also be printed). Its main features are a table and graph that present analysis results and other key information about each scenario. These features are designed to help you evaluate individual scenarios and to compare scenarios against each other.
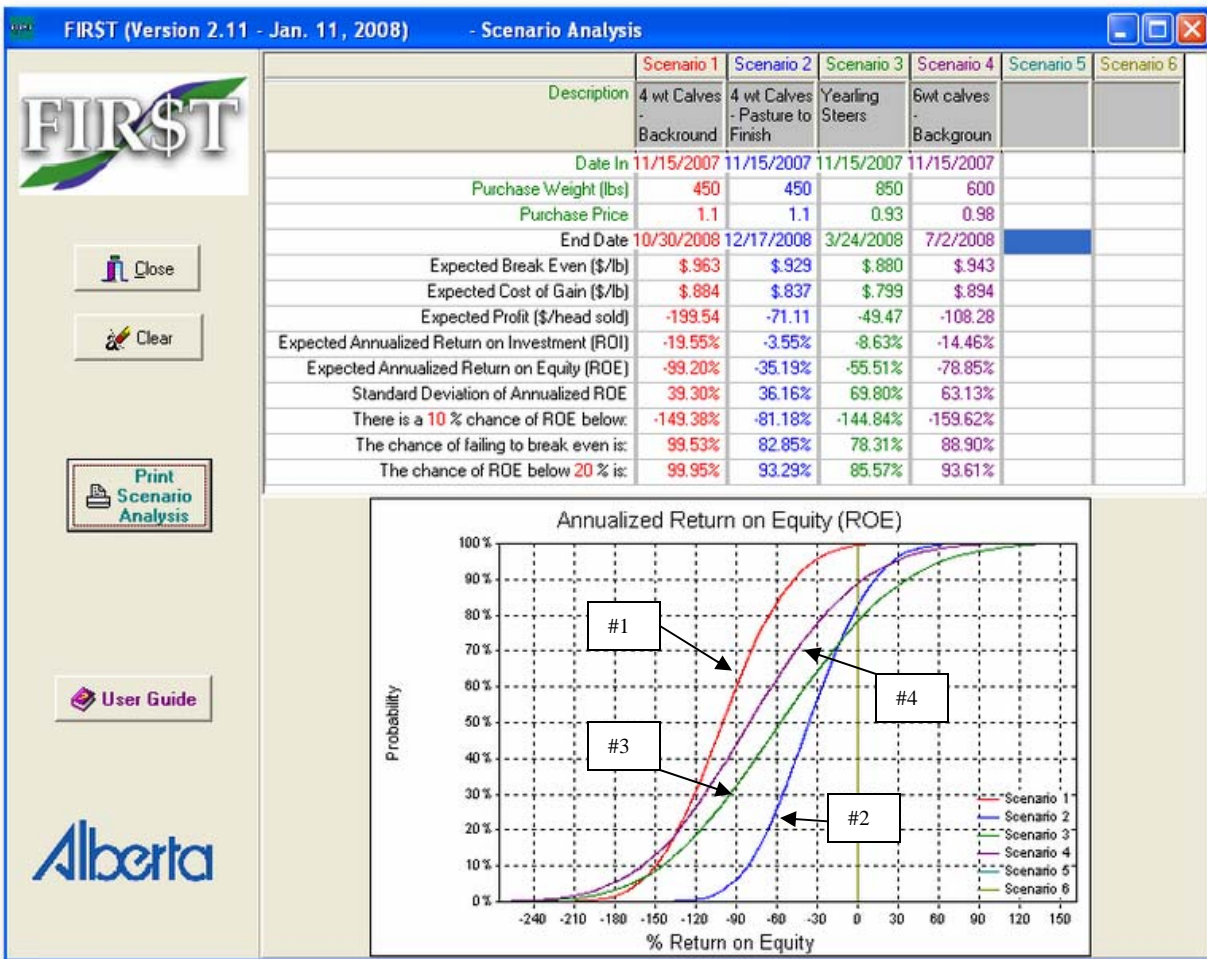
Figure 4 - Analyzing the Demo File

Figure 4 above shows the Scenario Analysis screen for the Demo file. It includes four different scenarios estimated from some 2007 costs and prices.

- **Scenario 1 (4 wt calves background to finish)** – light calves, purchased in November, placed on full feed, and finished in October.
- **Scenario 2 (4 wt calves pasture to finish)** – the same light calves purchased in November, but pastured the following summer then finished in December.
- **Scenario 3 (Yearlings)** – a completely different investment in heavy feeders, purchased in November and finished by the following March.
- **Scenario 4 (6 wt calves background to finish)** – heavier calves purchased in November, and finished in July.

Interpreting the Results Table

The table located in the upper part of the Scenario Analysis screen contains key information you need for decision-making. Breakevens, Costs of Gain, Profit, ROI and ROE are different ways of reporting "expected" returns, because they represent the average outcomes based on the information you have provided. Note that ROE (return on equity) is the only measure that is reported in both the table and the graph. For example, the table above shows that the Expected Annualized Return on Equity (ROE) is *minus* 99.20%, *minus* 35.19%, *minus* 55.51% and *minus* 78.85% for Scenarios 1, 2, 3 and 4 respectively. These numbers can also be read from the graph. The Standard Deviation (SD) of Annualized ROE is a simple measure of risk. Higher SD's mean higher risk (see below for more information).

An important feature contained in this table is the ability to change the percentages in the last and third-from-last lines of the table. For example, the third-from-last line says "There is a 10% chance of ROE below… -149.38%, -81.18%, -144.84% and –159.62%." These same numbers can be read from the graph by reading from the left on the10% probability line. You can also change the10% number by clicking on it and entering another number (perhaps 5%). The values calculated here represent value at risk. For more information, see page 24.

Interpreting the Graph

One of FIR$T's key features is its ability to look at risk differently. Note that there are four curves on the graph representing the Demo file's four scenarios. They are colour-coded and labeled. These curves show the probabilities (on the left side of the graph) of failing to reach any particular level of ROE (on the bottom of the graph).

For example, in Scenario 1 there is a 50% chance of failing to reach –99% ROE (read across the graph from the left side on the 50% probability line). In other words, there is a 50% chance of losing more than 99% of your equity (not a very promising investment!). Note that Scenarios 2, 3 and 4 are more promising, because they lie further to the right, which means they will likely have a better ROE. However, they are still unattractive because none of them is expected to break even. One possible message is that in this case, it makes better sense to feed calves more slowly and pasture them next summer, than it does to feed them more aggressively. This supports the common belief that the cheapest gains are on grass.

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Secondly, note that the graphs of Scenarios 1 and 2 stand up straighter, or are more vertical than the others. This means that they are not as risky as Scenarios 3 & 4, because their range of possible returns is not as large. In fact, the riskiest investment would be Scenario 4 (the 6 wt calves). Its curve is the flattest, and it has the worst value at risk (-159.62%). Scenario 2 (the 4 wt calves – pasture to finish) is the least risky (-81.18%).You can also read these numbers from the table, in the third line from the bottom (labeled "There is a 10% chance of ROE below:").

Consider Scenarios 2 & 3, and note that they have the best expected ROE's (-35.19% and -55.51%, reading along the 50% probability line or from the table). However, Scenario 3 (the Yearlings) is considerably more risky. The message here might be that if you purchase the yearlings, it's relatively more important to do some risk management.

And finally, reading from either the graph or the table, none of these scenarios is very attractive because they all predict a loss. Should you proceed with any scenario that forecasts a loss? The answer is… "It depends." For more discussion, read the next section.

Using FIR$T to Make Better Management Decisions

One of our main goals with the FIR$T program is to help you make better management decisions by getting a better handle on risk. Risk can be defined simply as the chance of an unexpected outcome. In the past, we have usually been content to calculate expected or average outcomes, but we have avoided thinking about the chances of failing to achieve those outcomes.

Evaluating Risk Management Strategies
In the Demo file, none of the scenarios show a profit, and the question remains, "Should you ever proceed with a scenario that predicts a loss?" You might choose to do so if you believe that the situation will change for the better over the period of the investment. For example, in the Demo file the cattle futures price estimates for Scenario 3 (Yearlings) are: "Highest": 1.05, "Most Likely": 0.9965, and "Lowest": 0.93. FIR$T predicts a loss of $49.47 per head or an ROE of –55.51%. If you believe that during the feeding period you will be able to sell (or hedge) these cattle at least $1.03, it may make sense to go ahead. Simulate this in FIR$T by making all three inputs $1.03. Some marketers use a guideline of a predicted loss of not more than $30, with the plan that some astute marketing and risk management will allow them to make money.

Another way to approach the same question is to change the way cattle futures estimates are framed (for more information, see page 24 - Framing your responses). Referring to the Demo file example, and knowing that the relevant contract month for cattle futures is at 0.9965, you might frame your responses like this:
- I would be very surprised if the price at which I will be able to hedge these yearlings is more than $1.04.
- The most likely price at which I will be able to hedge these yearlings is $1.02
- I would be very surprised if the price at which I will be able to hedge these yearlings is less than $0.99

The main difference with this approach is that the focus has changed from what you think the futures price will be at the end of the period, to what you think you can hedge it for between now and then. It also assumes that you have an active risk management and marketing strategy in place. Making these changes in the Demo file example improves the ROE to -19%, or a loss of 1.5% or a loss of $17 per head (not shown).

> *Special Note:* If you frame your responses using this latter strategy, you might choose to proceed only with investment scenarios that predict a profit, because your risk management strategy would already be incorporated in the analysis.

Incorporating other Risk Management Strategies

- **Contracting** – If you want to evaluate the effect of contracting cattle prices and/or feed grain, one approach is to "narrow" the three point estimate for those inputs. For example, if you had the chance to contract cattle for future delivery at $CDN 1.00, then you could simulate that in FIR$T by entering a Canadian Price of $1.00 for all three inputs ("Highest", "Most Likely" and "Lowest"). This means that the Canadian Price would now be fixed (like other non-varying inputs), and the only thing left to vary would be the feed grain price. Contracting (or pre-buying) feed grain can be simulated in the same way.

Special Notes:
   - o Because of computer programming complexities, occasionally the above strategy will cause an error message. If this happens, try separating the highest and lowest prices from the most likely price by a very small amount (perhaps $0.01).
   - o If you were to contract a portion of your cattle or barley, you could narrow (rather than completely fix) the three-point estimate.

- **Futures-Based Strategies (Hedging, Options)** – simulating the effects of hedging or options can also be achieved by narrowing the three-point estimates (or input distributions) for the relevant inputs. For example, if you had the opportunity to sell cattle futures at $1.02, you could simulate that in FIR$T by entering $1.02 for the "Highest", "Most Likely" and "Lowest" values. This means that the futures price is now fixed but the basis, exchange rate and barley price can still vary. Purchasing an option on cattle futures has the effect of cutting off the downside while leaving the upside open. In FIR$T, you could narrow the distribution by moving the "Lowest" value very close to the "Most Likely", but leaving the "Highest Possible" unchanged. Note that in the case of options, you would have to account for the cost of the premium.

   > *Special Note:* The strategies above are examples, and are provided for discussion purposes only.
- **Insurance** – If an index-based cattle price insurance program becomes a reality in the future, modifications to FIR$T will be considered. For more information see the section on page 25 - Future Developments.

Limitations of FIR$T

FIR$T is designed to evaluate expected return on equity (ROE) and associated risks for up to six different cattle feeding scenarios. However, there are several applications where problems may arise, due to the limitations of scope, design and programming. ***We recommend that if you experiment with FIR$T in the following situations, that you do so with caution:***

- FIR$T is not designed for scenarios where cattle are sold before they reach slaughter weights. Ending price information (futures prices, basis and currency exchange rates) specifically applies to finished cattle going to slaughter. However**, *if you experiment with scenarios where cattle are sold before the finishing phase, the feed grain price should not be allowed to vary.*** In this special case, all three feed grain price estimates should be the same. Failure to do this may result in inaccurate results.
- FIR$T is not designed to analyze situations where cow-calf producers feed out cattle in their own feedlots. However, if you wish to experiment, we recommend that you do so with caution. Consider the following issues:
  - **Yardage –** In a custom feeding situation, yardage is a known factor since it is usually quoted as a charge to the cattle owner. In most mixed grain and livestock operations, yardage is very difficult to calculate, since it includes labour, fuel, repairs, overhead, depreciation and other costs. In addition, it is very sensitive to the utilization of feeding facilities (whether or not the feedlot is full). A small error in estimating yardage can result in an extremely misleading analysis.
  - **Average Daily Gain and Dry Matter Conversion –** Larger feedlots usually use these two inputs to describe how their cattle are performing, while smaller feeding operations may not be familiar with this process. To learn more, see page 12 - Average Daily Gain and Dry Matter Conversion Tables.

Underlying Principles, Standards and Definitions

Terms/Definitions/Standards
In the creation of FIR$T, assumptions have been made about some key inputs and parameters.

- **Interest on Feed** – FIR$T assumes that feed is being charged to the cattle owner at the end of each month over the whole feeding period. It is also assumed that interest is charged each month on the accumulated balance. As an approximation, FIR$T calculates interest on feed by using the specified rate of interest on the entire feed amount, but for only half of the feeding period. This approximation will result in interest costs being slightly lower than they should be, because cattle tend to eat more in the second half of the feeding period.
- **Death Loss** – FIR$T assumes that all death loss occurs after 25% of the intended feeding period has occurred. This applies to each phase of the feeding process (backgrounding, pasture and finishing). This means we assume that dead animals were fed for 25% of the feeding period, and that these costs (including interest) are charged against the animals eventually sold.
- **Return on Equity** - Return on Equity (ROE) is calculated by dividing total return (revenue – total costs) by total investment. ROE is the principal measure of profitability

used in FIR$T. Because it is expressed as a percentage and adjusted to an annual basis, ROE allows comparisons among different feeding scenarios. ROE also incorporates interest costs and percent equity held by the investor, which means that investors can easily see the effects of leverage (investing borrowed money).

- **Return on Investment** - Return on Investment (ROI) is calculated like ROE, but the ROI calculation removes all the effects of borrowing money. ROI can be thought of as the return to everyone's investment (yours and the bank's).

- **Expected Profit ($/Head Sold)** – FIR$T calculations are based on a single feedlot animal, and most results are reported on a percentage or $/lb basis. However, expected profit is reported as $/head sold. It is important to note that this is $/head *sold*, not the original number "placed." FIR$T adjusts for death loss at each stage of production (backgrounding, pasture and finishing), and costs associated with dead animals are transferred to those eventually sold. Profit per head sold is ***not*** an appropriate measure for comparing different types of cattle investments, because it does not consider varying cattle weights or days on feed.

Principles

- **Risk** – Risk can be defined as "uncertainty that matters," or "an uncertain event or condition that, if it occurs, has a positive or negative effect on your objectives."[4] There are two components to risk: probability, which is the likelihood that an event will occur, and impact, which is the effect that event would have, should it occur.

   In FIR$T, risk relates to the variability of outcomes actually achieved (measured by return on equity). FIR$T tables and graphs use several methods to report this variability including standard deviation, value at risk, and the shapes and slopes of the graphs. It is extremely important to understand that variability (and therefore risk) works in both directions – positive and negative. In other words, sometimes things work out worse than you expect; other times, they work out better.

- **Triangular Distributions** – FIR$T uses a three-point estimation process to produce triangular distributions for finished cattle prices, basis, feed grain prices, and currency exchange rates. The three points required for each of these inputs are *lowest, most likely and highest.*

   This process is a simple way to describe variable inputs in statistical and mathematical terms. The process may seem simplistic, but it encompasses all of your knowledge and experience in buying, selling and feeding cattle. FIR$T uses these inputs to calculate the mean and standard deviation, and also to run the Monte Carlo simulation process that creates the Return on Equity (ROE) probability graphs.

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[4] Adapted from Dr. David Hillson, www.risk-doctor.com.

Special Note: Framing your responses - When estimating *lowest* and *highest* values, it is extremely important to frame your responses consistently. It might be argued that the lowest possible value is often zero and the highest is infinite but this approach is unhelpful, at best. After considering all the relevant information and advice, we suggest that you frame your estimates by stating, "I would be very surprised if the value were lower (or higher) than …." This approach incorporates your experience and your tolerance of risk, and encourages a consistent approach.

- **Mean and Standard Deviation** - Mean and standard deviation are statistical terms that describe the variability of a series of values. The mean is the same as a simple average (the total of all the values divided by the number of values). In FIR$T, means and "expected" values are essentially the same thing (Expected Return on Equity, for example). Standard deviation is a measure of how far individual values tend to vary from the mean. The formula can be found in any basic statistics textbook. In FIR$T, standard deviation is important only as a simple measure of risk. Higher values indicate more variability; hence, more risk.

- **Value at Risk** – This is a concept adopted from the business world that assesses business and financial risk using only one number. In FIR$T, it is used to estimate the proportion of your investment that you can expect to lose 10% of the time. On the Scenario Analysis screen, the third-last line in the table reads, "There is a 10% chance of ROE below" (10% can be changed to 5 % by clicking and typing over the line). The "value at risk" is read from the columns to the right. As long as you are consistent in choosing either 5% or 10%, the value at risk becomes a single-number measurement of the risk involved in the investment. Value at risk is normally reported as a $ value, but because FIR$T is based on one feedlot animal, value at risk is reported as a percentage of your equity in the investment.

Monte Carlo Simulation - Monte Carlo simulation is a mathematical and statistical technique that allows FIR$T to predict probabilities for a complete range of expected outcomes. Monte Carlo simulation was used to evaluate WWII battle strategies, but it was understood in theory long before. Basically, the process involves the calculation of thousands of possible outcomes, based on a series of variable inputs. In the case of FIR$T, the expected Return on Equity (ROE) is calculated 10,000 times.

Today's easy access to computers and specialized software make this type of programming available for projects such as FIR$T and CropChoice$. Original prototypes were created using Microsoft Excel and the @RISK add-in. Alberta Agriculture and Food specialists create the public release versions using Delphi program development software.

The Monte Carlo technique used in FIR$T involves the creation of triangular distributions for ending cattle prices, basis, barley prices and currency exchange rates. These distributions are randomly sampled, taking into consideration the correlations among these variables, and the results are calculated and reported in tables and graphs. Table 3 below shows the correlation

coefficients used in FIR$T. These values are provided for reference purposes only, and cannot be modified by the user.

Table 3 - Correlation Coefficients

		Barley Price	Futures	Basis	Exchange	Can Price
		1	2	3	4	5
Barley Price	1	1				
Futures	2	-0.064	1			
Basis	3	0.007	-0.194	1		
Exchange	4	-0.183	0.043	0.156	1	
Can Price	5	-0.044	0	0	0	1

Future Developments

FIR$T provides a unique analysis of the risk associated with specific cattle feeding investments. Graphs showing the probability of Return on Equity (ROE) are especially useful in making the concepts of risk and return easier to understand and to evaluate. Using this same approach, FIR$T could be adapted to evaluate risk management strategies such as contracting, hedging, options and insurance[5] (CropChoice$ already does these types of analyses for Alberta's grains and oilseeds industry).

Currently, FIR$T allows you to approximate the effects of contracting, hedging and options by modifying the "highest," "most likely" and "lowest" estimates. For example, if you were to contract cattle at a specific price in $CDN, then cattle price is no longer variable, and you would enter the same contract price for each of the price inputs. Future versions of FIR$T may include specific tools designed to evaluate these and other strategies. For more discussion, see page 21 - Incorporating other Risk Management Strategies.

Another feature that is being considered for future versions of FIR$T is that of allowing variable inputs for average daily gain (ADG) and dry matter (DM) conversion. Currently these two key performance inputs are entered as single point estimates. The concept behind this proposal is that unexpected weather events may cause ADG and DM conversion to vary from expected values. For example, heavy rain or snow, resulting in muddy pens can cause major reductions in performance. This feature would help manage a large portion of your feedlot production risk, as well as the market risk that's currently addressed.

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[5] As of January 2008, the Alberta Beef Producers and Agriculture Financial Services Corporation (AFSC) are studying the potential of a Canadian Cattle Price Insurance Program (CPIP). This would be an insurance program with premiums and payouts, where producers could choose to buy coverage on a case-by-case basis. Insurance payouts would be calculated against a "made-in-Canada" cattle price index.

Acknowledgements

FIR$T was created by Alberta Agriculture and Food Economics Unit and Ag Commercialization Branch.

Getting More Information

For more information about FIR$T and other risk management tools, contact the Alberta Ag-Info Centre toll-free in Alberta: 310-FARM.

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