Cognalysis™ Reserving System User Manual

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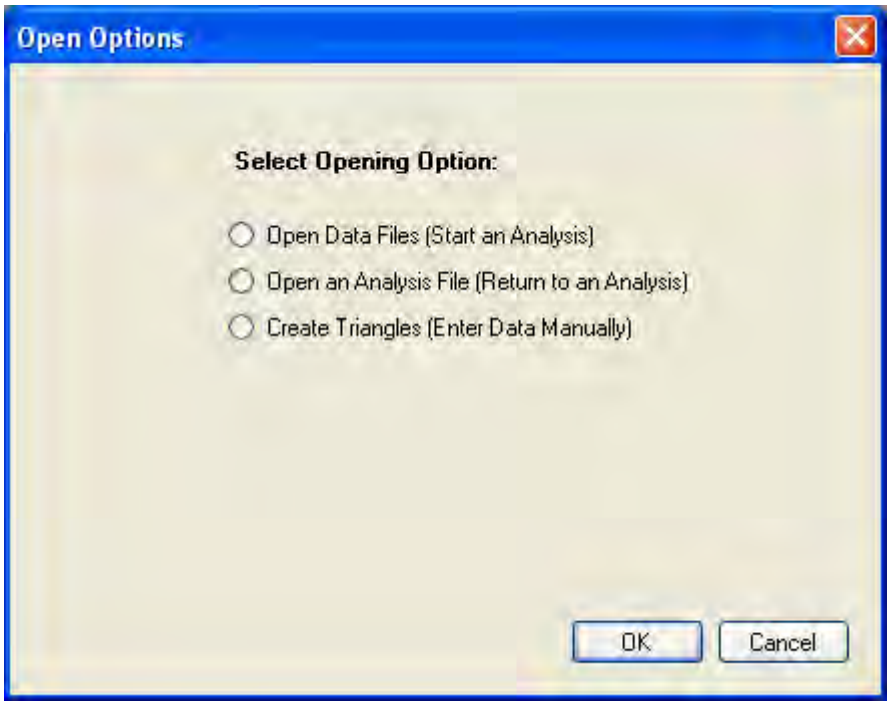
1.0 Starting an Analysis

Starting or Opening an analysis can be done in one of three ways:

1. Creating a new analysis file by pulling data from a file
2. Opening an existing analysis file
3. Creating triangles by entering data manually or by cutting & pasting

The user begins the analysis by selecting Open from the File menu at the top of the screen or by choosing the folder icon on the toolbar below the menus at the top of the screen. Upon selecting open the user can choose from these three options.



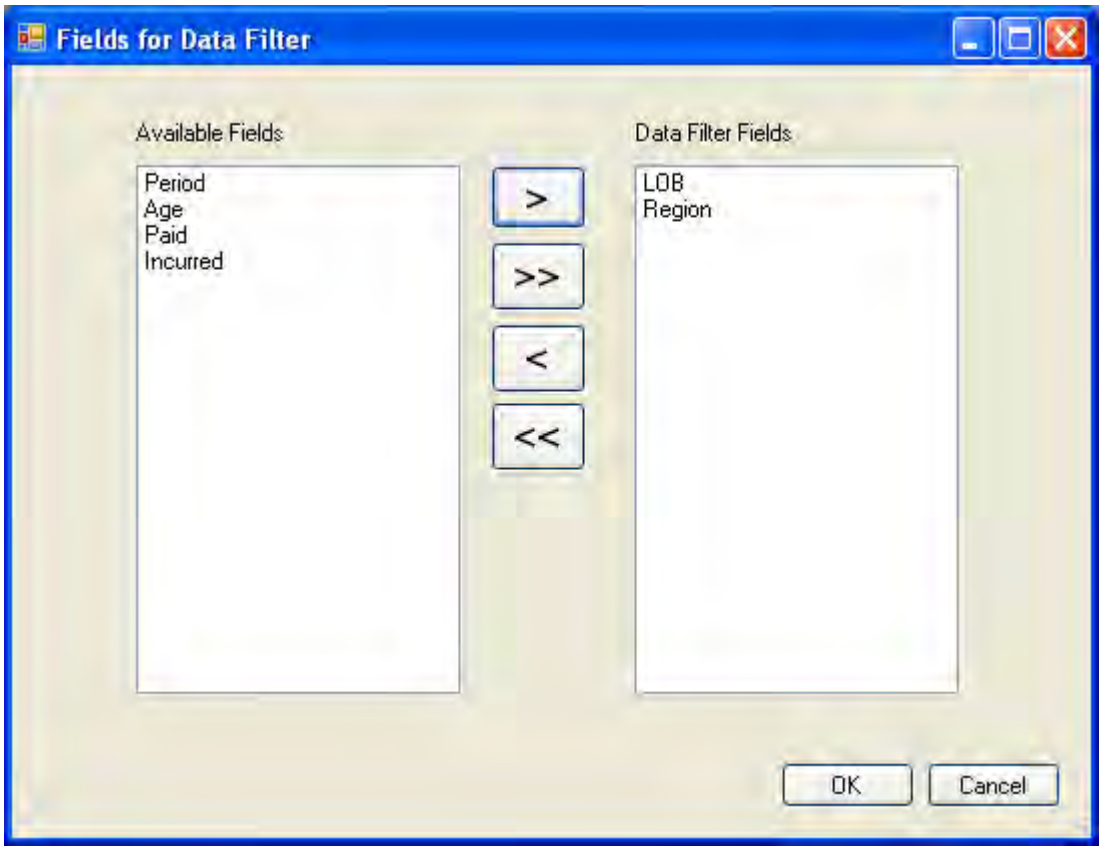
1.1 Opening a Data File

The Cognalysis™ Reserving System allows for a wide variety of layouts for input data.

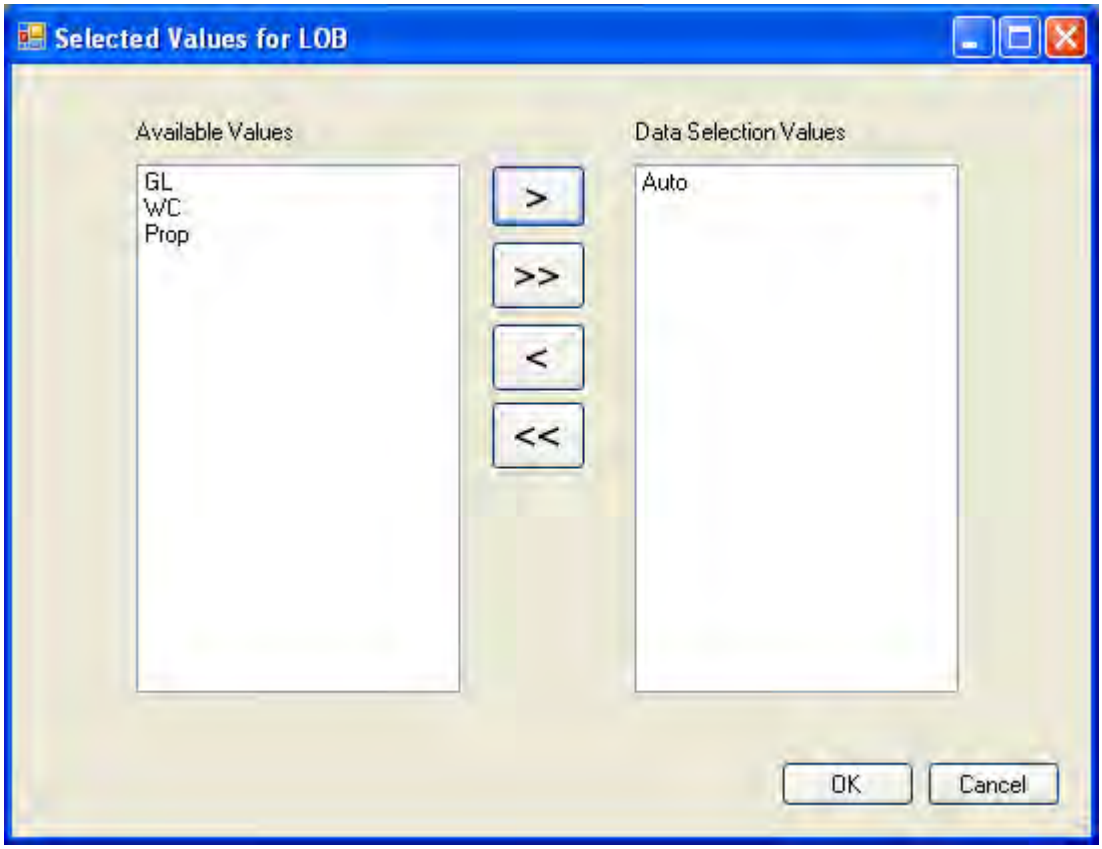
When you start a new analysis by opening a data file, you will be able to browse for the file containing loss information. Currently supported file types are Comma Separated Variable (.csv), and Microsoft Access Database (.mdb). If the input file is an Access Database file, you will also be prompted to select the table containing the loss data.

After selecting the appropriate file you will be given the option to filter the data.

This allows you to import a subset of records from your data source. In this way the data source can be built in such a way that it includes data for multiple analyses. If you choose to filter data, select the fields you are interested in filtering by highlighting a field and clicking the right single arrow. Selecting the right double arrow will select all fields. To remove a single field, highlight the field on the right and hit the left single arrow (the left double arrow will move all the fields back to the Available Fields box). In the example shown below, the Line of Business (LOB) and Region fields have been selected for filtering and have been moved from the Available Fields box to the Data Filter Fields box.



Once the fields for filtering have been selected and the user has selected the OK button, the user will be given the opportunity to select the values within the selected fields to include in the analysis. In the example shown on the next page, Auto has been selected for inclusion from the list of unique values in the data file in the LOB field. Subsequently, the West Region is shown as being selected for inclusion from the list of unique values in the data file in the Region field.


Selected Values for LOB
Available Values
GL
WC
Prop
>
>>
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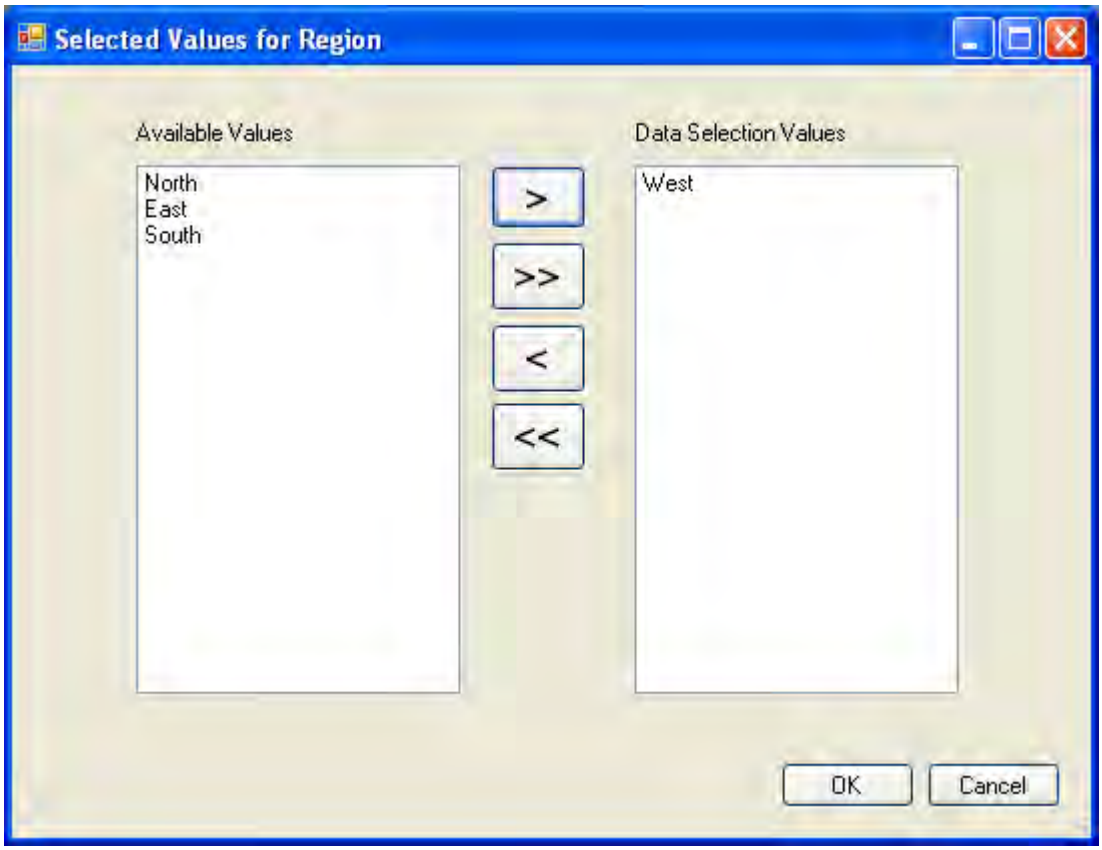
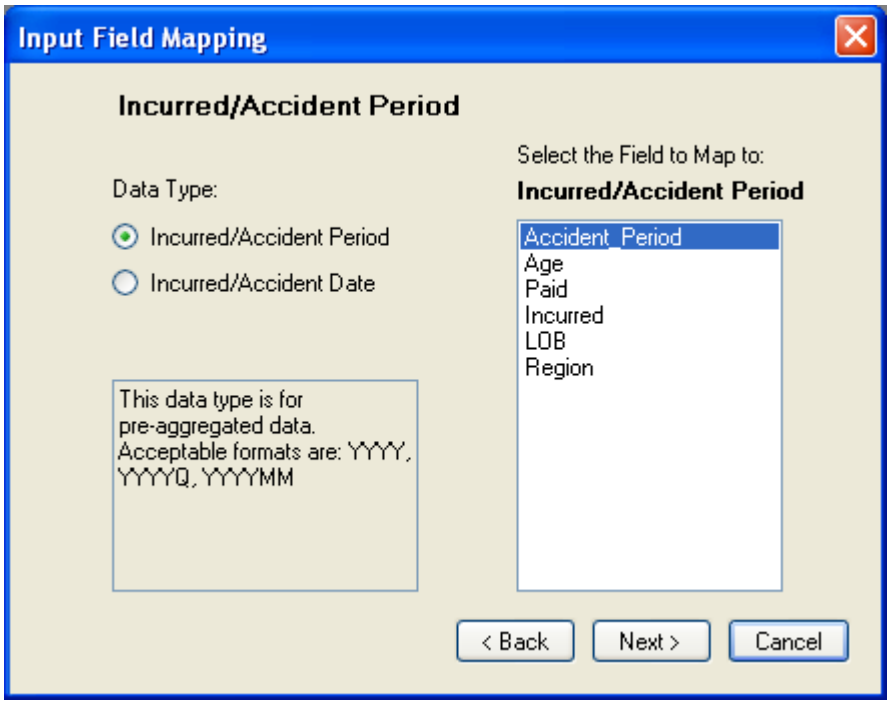
<<
Data Selection Values
Auto
OK
Cancel

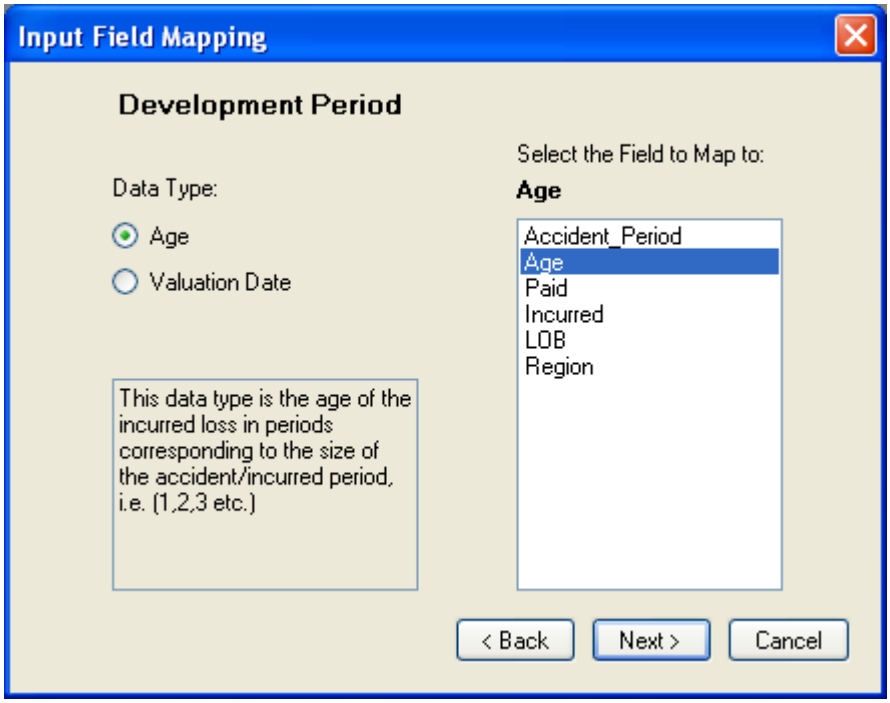

Selected Values for Region
Available Values
North
East
South
>
>>
<
<<
Data Selection Values
West
OK
Cancel

If you choose not to filter data, or after you filter data, you will be taken through a series of screens to assign the fields of data to various data elements (this may occur automatically if the field structure and names are identical to a previous import). In the screen shown below, we are given the list of fields in the data file that may be chosen to map to Accident Period.



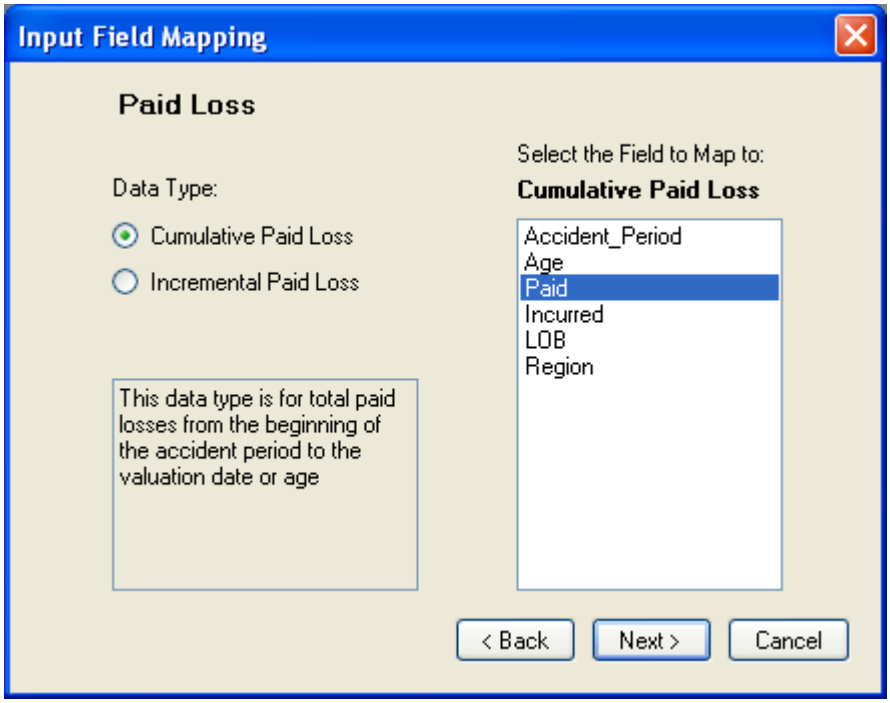
The Accident Period can be determined in one of two ways. It can be pre-identified on the source data, or it can be based on an accident date. If the period is on the source data itself, it must be in acceptable format (YYYY, YYYYQ, or YYYYMM). If accident date is to be used to build the accident periods, you will be asked to identify the length of the periods (annual, quarterly, or monthly).

You will next be asked to map Development Period.

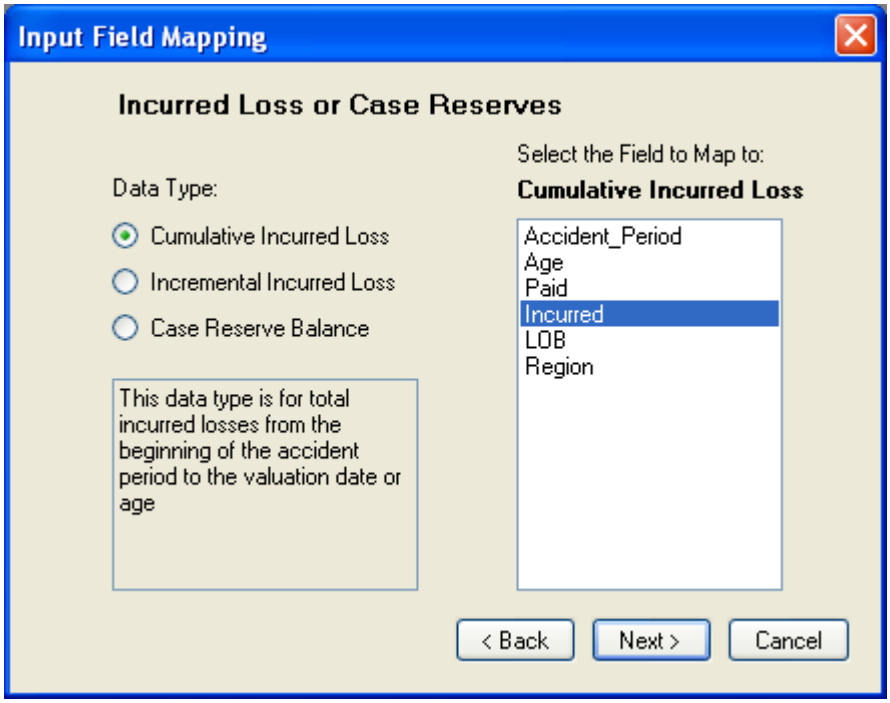


Similar to accident period, development period can either exist already on the data source, or it can be determined using valuation date.

Next you will be prompted to map paid losses. These can be incremental amounts or cumulative amounts.

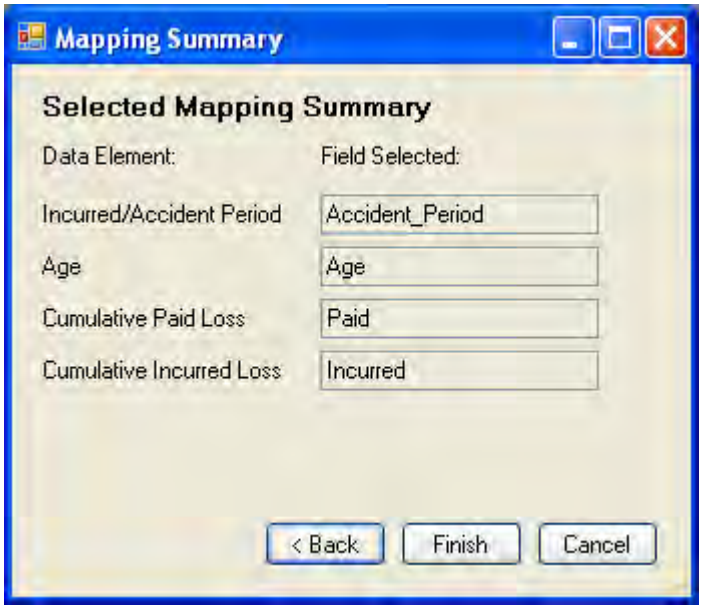


Finally, you will be prompted to map incurred losses (or build them using case reserves + paid).

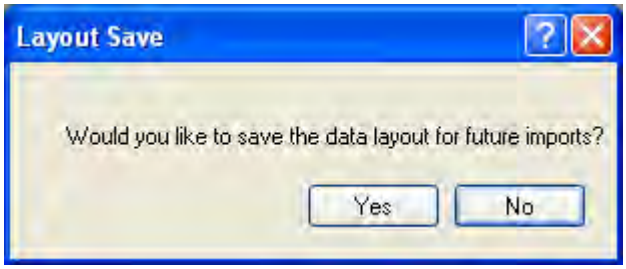


Your options here include mapping a field to cumulative incurred losses, incremental incurred losses, or case reserve balances.

After mapping each of these elements, you will be given a summary as shown below with the option to go back and remap as needed.



Upon completion of the mapping, the option to save the layout is provided. When a mapping is saved, future data imports will automatically recognize if a data source file is of the same format, and make the appropriate mappings. Since data filtering and length of accident period could vary from analysis to analysis from within the same data, these questions are asked regardless.



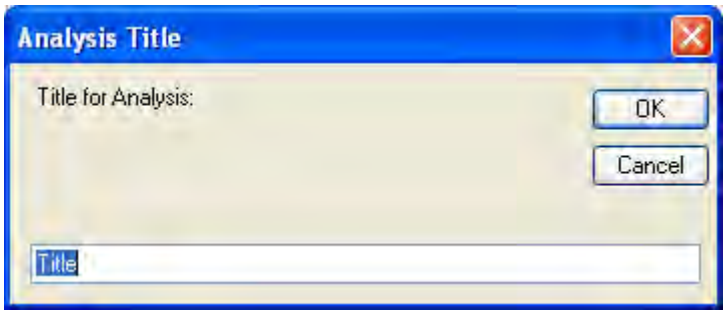
The next step is the opportunity to import premium or exposure information. If you choose to import premium or exposure, you will select the file containing the premium or exposure and if necessary assign the Time Period Identifier and Premium or Exposure Identifier. [If mapping is required, you will be given a mapping summary and the opportunity to save the layout for future premium importation.] If you choose not to import premium or exposure, a value of 1 will be used in each period for calculations.

This will be followed by the option to import a previous analysis file. This is the analysis file corresponding to a previous valuation date. Importing this information has a number of benefits:

- Allow you to start your analysis with previously selected factors, loss ratios, and selected ultimate losses.
- Allow you to compare actual loss development against previously projected loss development as well as to compare changes in selected ultimate losses.

If you chose to import a previous analysis file, you will be able to browse for the file.

The user will then be asked to provide a title for your analysis. After entering the title, the setup for the analysis is complete.



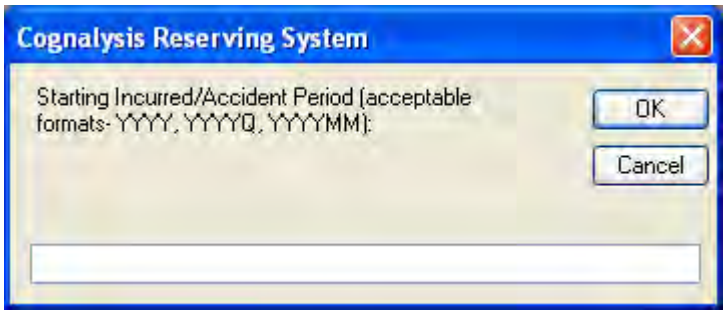
A user may edit the title at any time by simply double-clicking the title shown on the screen.

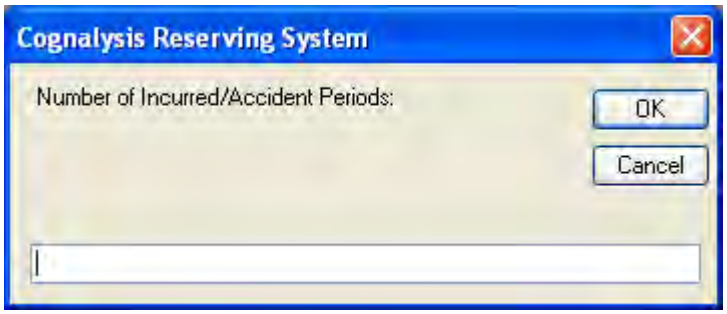
1.2 Opening an Analysis File

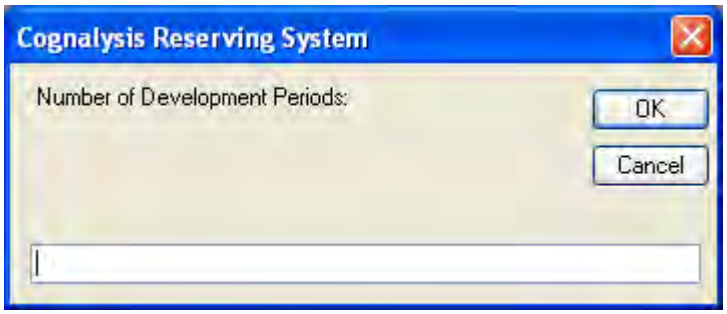
When you start a new analysis by opening an analysis file, you will simply open a previously saved analysis file by selecting the file from the usual file menu box. The analysis file is the file used by Cognalysis that contains imported data (paid loss, incurred loss and/or premium or exposure) and any selections made (loss development factors, seed loss ratios, ultimate values, etc.).

1.3 Create Triangles

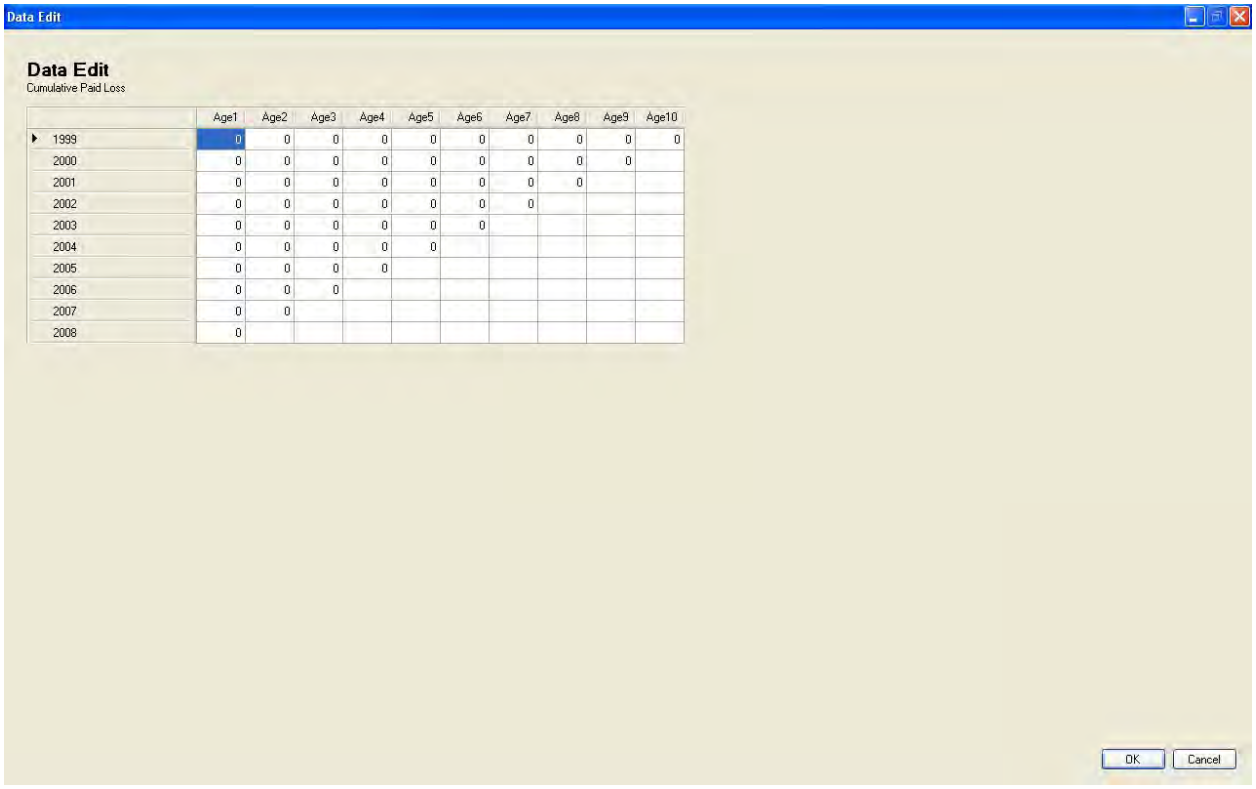
If you choose to create triangles by manually entering data, you will start by defining the characteristics of the triangle. This includes defining the starting incurred or accident period, the number of incurred or accident periods and the number of development periods. This allows the user the flexibility to create triangles in a multitude of period and development increments.



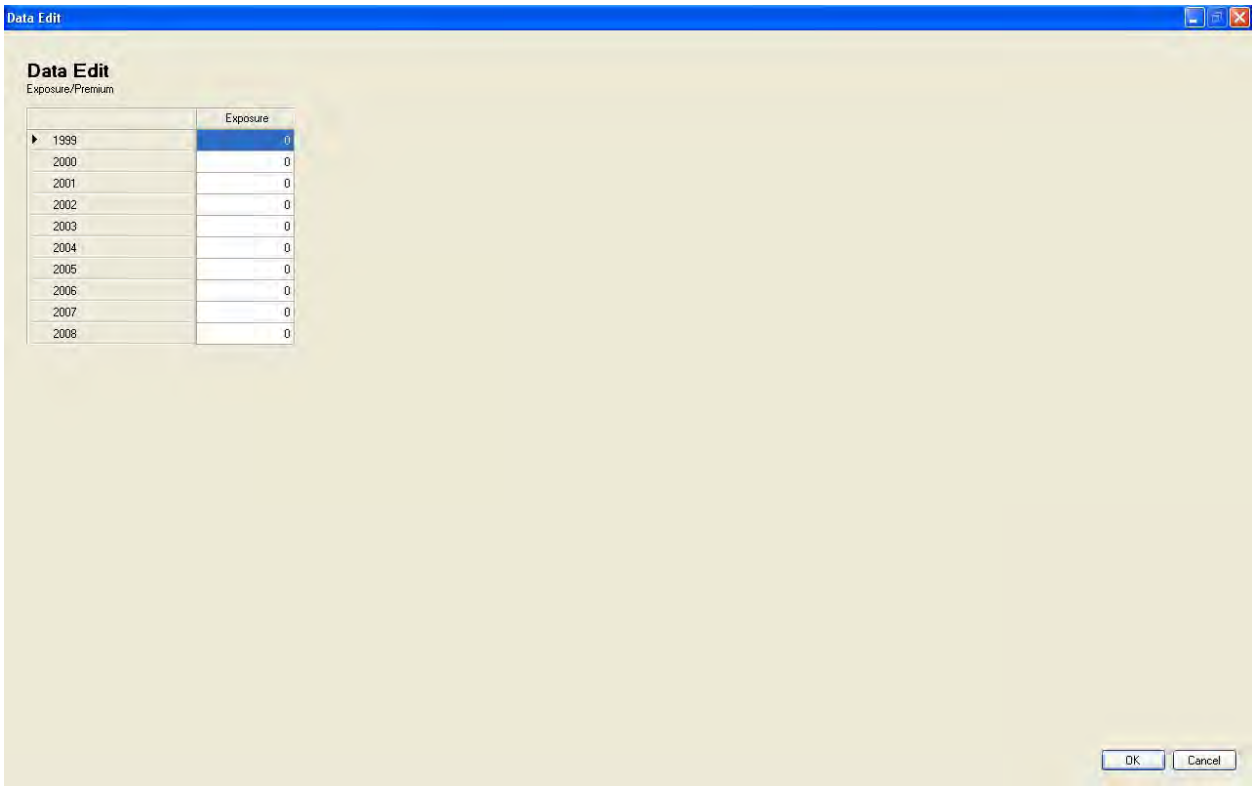




After defining the triangle parameters, the user will then be provided a grid for entering cumulative paid loss values. The user can type values or paste the values in from clipboard data copied from other sources. After entering all the paid values, select OK in the lower right corner of the screen.



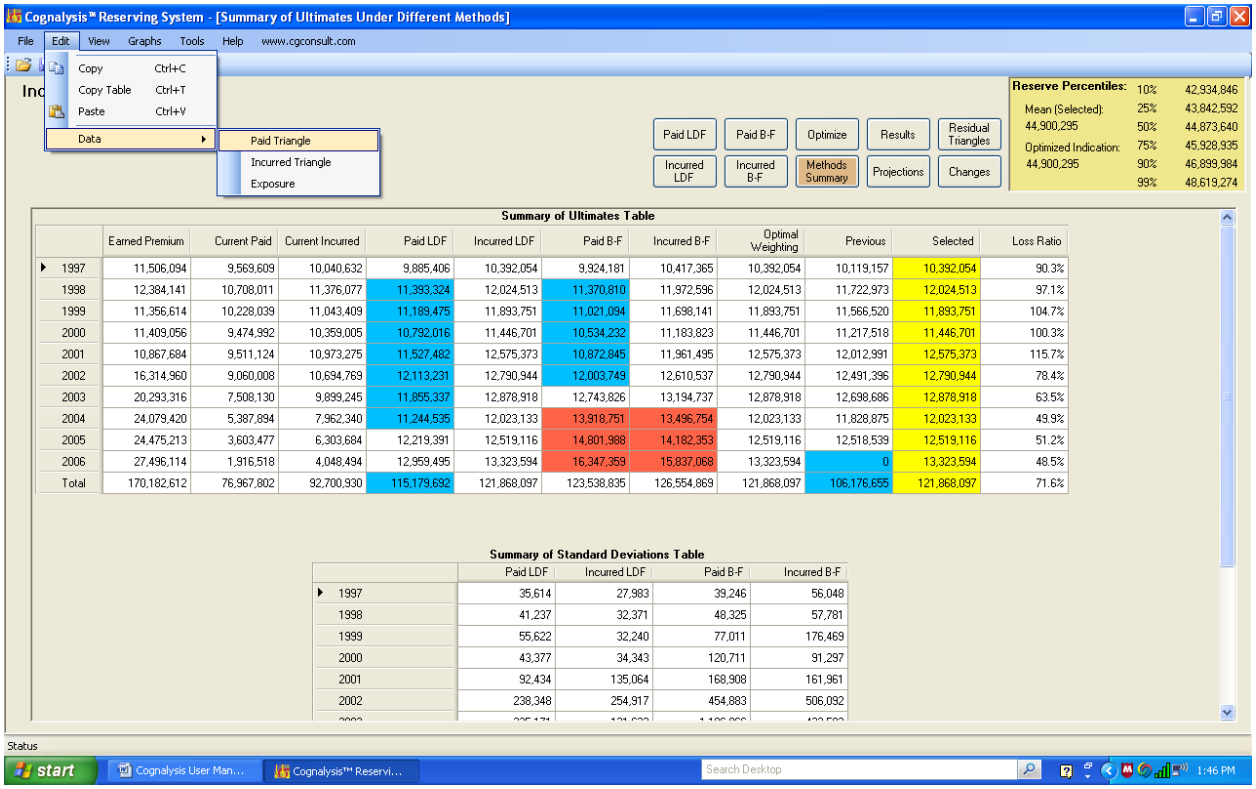
The user will then be prompted to enter incurred values and exposure or premium values.



The user may then enter a title for the analysis and optionally retrieve a prior analysis.

2.0 Editing Data

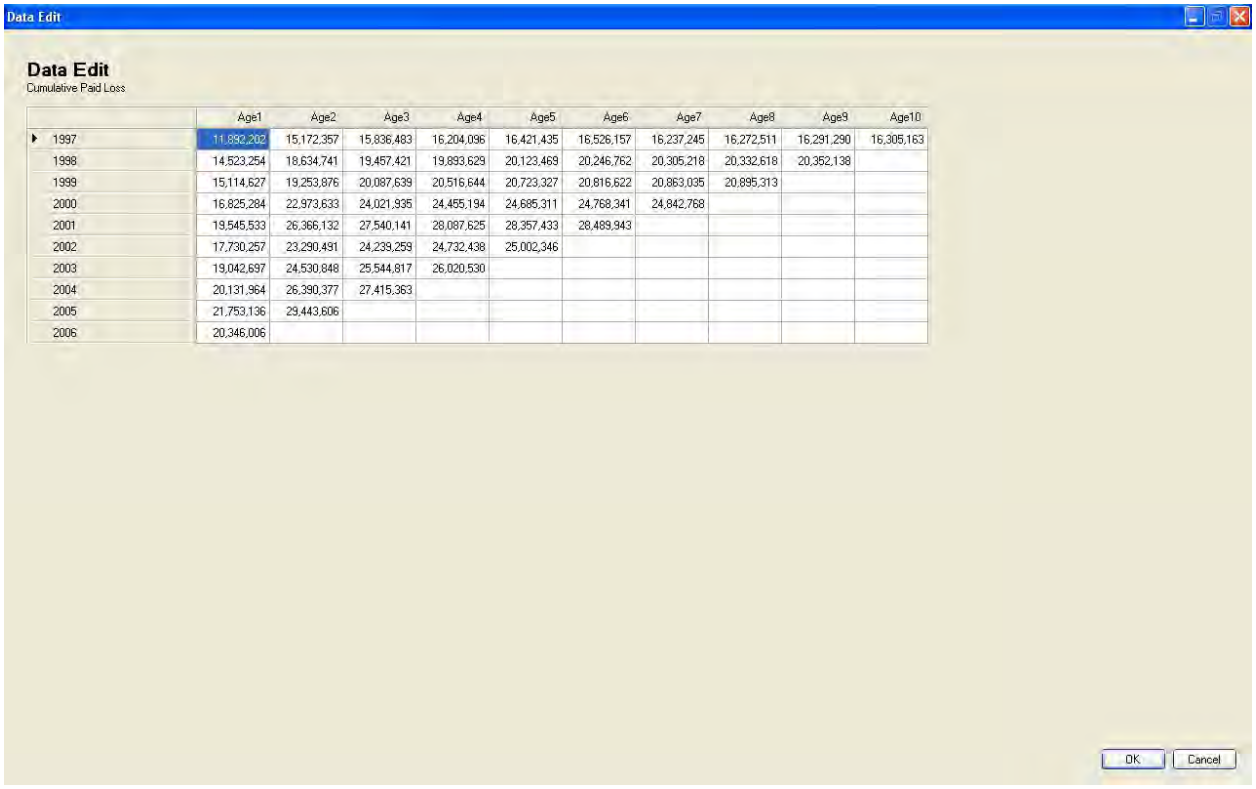
Users have the ability to edit loss (incurred or paid triangle) or premium/exposure values. The user can choose the element to be edited from the Edit/Data menu option at the top of the screen or by double clicking any number of the paid triangle on the Paid LDF screen, any number of the incurred triangle on the Incurred LDF screen, or any earned premium number on the Paid B-F or Incurred B-F screen.



	Earned Premium	Current Paid	Current Incurred	Paid LDF	Incurred LDF	Paid B-F	Incurred B-F	Optimal Weighting	Previous	Selected	Loss Ratio
1997	11,506,094	9,569,609	10,040,632	9,885,406	10,392,054	9,924,181	10,417,365	10,392,054	10,119,157	10,392,054	90.3%
1998	12,384,141	10,708,011	11,376,077	11,393,324	12,024,513	11,370,810	11,972,596	12,024,513	11,722,973	12,024,513	97.1%
1999	11,356,614	10,228,039	11,043,409	11,189,475	11,893,751	11,021,094	11,698,141	11,893,751	11,566,520	11,893,751	104.7%
2000	11,409,056	9,474,992	10,359,005	10,792,016	11,446,701	10,534,232	11,183,823	11,446,701	11,217,518	11,446,701	100.3%
2001	10,867,684	9,511,124	10,973,275	11,527,482	12,575,373	10,872,845	11,961,495	12,575,373	12,012,991	12,575,373	115.7%
2002	16,314,960	9,060,008	10,694,769	12,113,231	12,790,944	12,003,749	12,610,537	12,790,944	12,491,396	12,790,944	78.4%
2003	20,293,316	7,508,130	9,899,245	11,855,337	12,878,918	12,743,826	13,194,737	12,878,918	12,698,686	12,878,918	63.5%
2004	24,079,420	5,387,894	7,962,340	11,244,535	12,023,133	13,918,751	13,496,754	12,023,133	11,828,875	12,023,133	49.9%
2005	24,475,213	3,603,477	6,303,684	12,219,391	12,519,116	14,801,988	14,182,353	12,519,116	12,518,539	12,519,116	51.2%
2006	27,496,114	1,916,518	4,048,494	12,959,495	13,323,594	16,347,359	15,837,068	13,323,594	0	13,323,594	48.5%
Total	170,182,612	76,967,802	92,700,930	115,179,692	121,868,097	123,538,835	126,554,869	121,868,097	106,176,655	121,868,097	71.6%

	Paid LDF	Incurred LDF	Paid B-F	Incurred B-F
1997	35,614	27,983	39,246	56,048
1998	41,237	32,371	48,325	57,781
1999	55,622	32,240	77,011	176,469
2000	43,377	34,343	120,711	91,297
2001	92,434	135,064	168,908	161,961
2002	238,348	254,917	454,883	506,092

After selecting the data element to edit the user will be given a data edit screen. Users can manually type in new values or paste values from clipboard data copied from other sources. After all values are edited, the user selects the OK button in the lower right corner to save changes and return to Cognalysis. The Data Edit screen is shown below.



In the case where premium or exposure is being edited, you will be prompted with a question regarding rescaling of loss ratios.

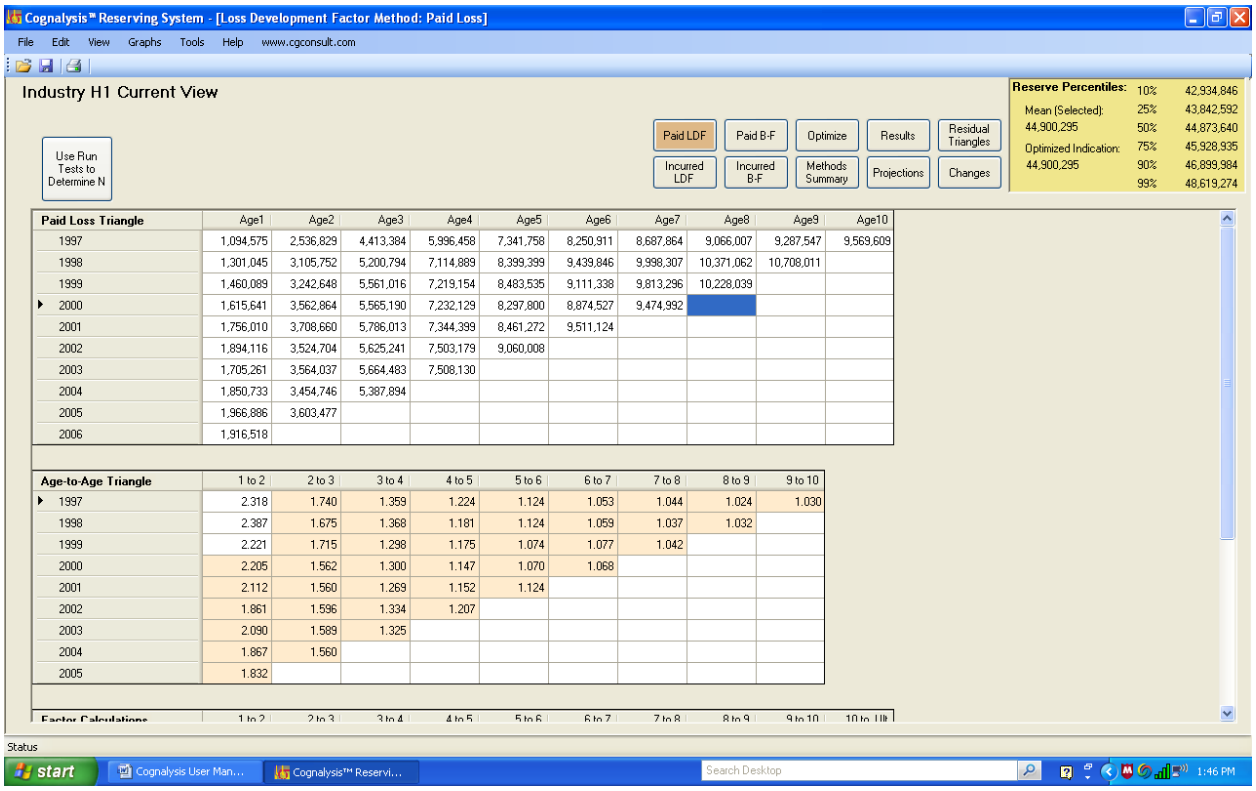
Rescaling would adjust the seed loss ratio to be consistent with the same level of losses before the change in premium or exposure.

3.0 Reviewing and Adjusting Methods

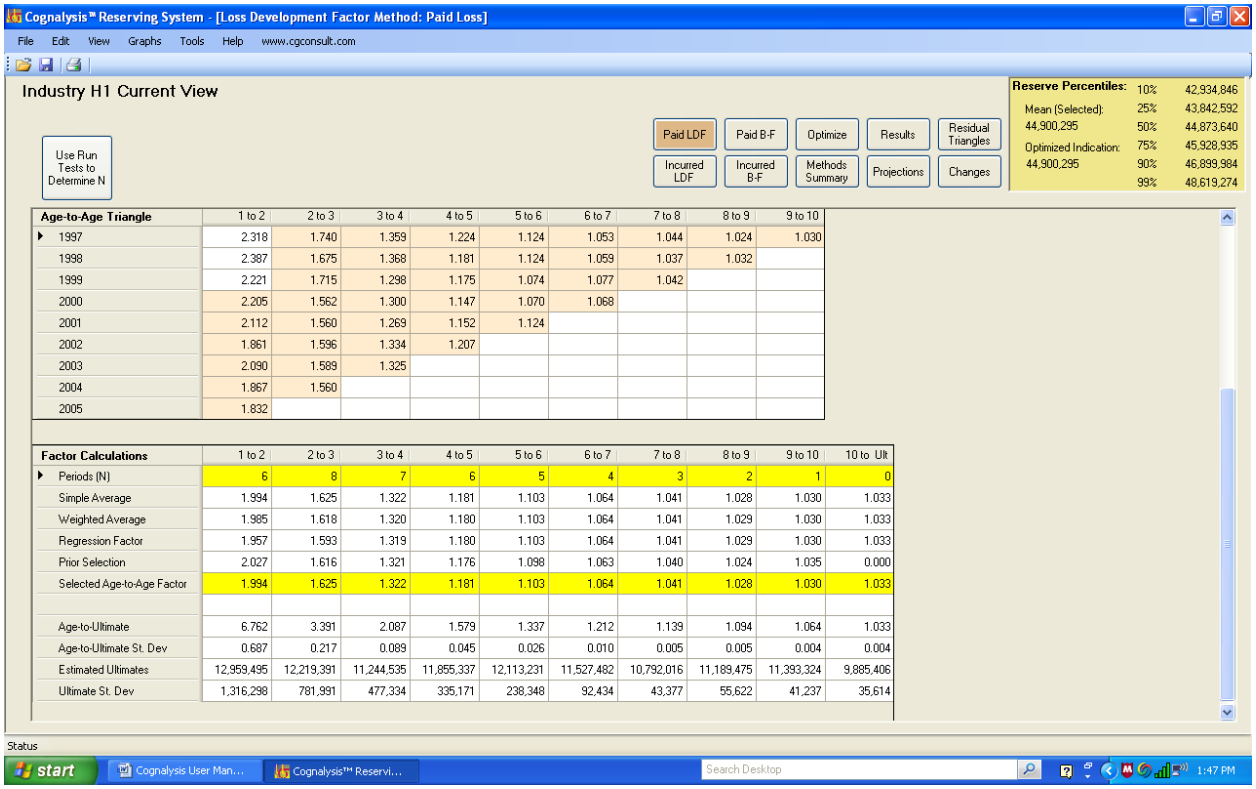
Cognalysis contains four standard techniques commonly used for analyzing ultimates. Those methods are the Paid Loss Development Method, the Incurred Loss Development Method, the Paid Bornhuetter-Ferguson Method and the Incurred Bornhuetter-Ferguson Method. Each of the methods as presented in the model is described below.

3.1 Paid LDF

Users can review and adjust the Paid Loss Development Factor method by selecting the Paid LDF button in the upper right part of the screen. The paid loss triangle will be shown as entered or imported. Double clicking on a cell in the triangle will allow the user to edit the values in the triangle. Below the triangle of loss values, the triangle of age-to-age development factors is shown. The highlighted values in the age-to-age factor triangle are the factors used in the weighted and simple averages.



The factor calculations are shown below the triangle of age-to-age factors. The rows highlighted in yellow contain the values that may be edited. A description of each row is given below.



Periods (N) – This value can be typed in by the user or it can be set to a default which employs run tests to determine the length of history to use for factor averages . A run test is performed using all of the available data points where a run is defined as a series of factors either above or below the median value. If an insufficient number of runs are observed given total number of data points and the significance level of the test, then the earliest factor is dropped. This procedure is repeated until the number of runs is sufficient given the remaining number of data points and the significance level. You can modify the significance level in the "tools – options – default squaring options" menu item to be either more stable or more responsive.

In order to set N to the default value, the user presses the "Use Run Tests to Determine N" button shown toward the top of the screen on the left side.

Simple Average - The simple average of development factors for each period for the most recent N values (the highlighted values in the age-to-age triangle).

Weighted Average - The weighted average of development factors for each period for the most recent N values (the highlighted values in the age-to-age triangle).

Regression Factor- The projected future value of the age to age factor based on linear regression. This regression method employs a stabilizing technique intended to avoid distortions caused by random fluctuations of data. More information about this technique can be found at www.cgconsult.com/docs/FactorMethods.pdf. A key parameter in this method is

the significance level, which can be adjusted in the "tools – options – default squaring options" menu item.

Prior Selection – If a previous analysis file was imported, this row will be populated with the development factors from that previous analysis. If a previous analysis file was not retrieved, this row will be blank.

Selected Age-to-Age Factor- In this row the user will select the incremental development factors. The user can type values into the cells or double click the row title for one of the averages shown above to select that set of averages. The user can also double click on any factor within the age-to-age factor triangle to select that factor for the corresponding period.

Age-to-Ultimate- This row shows the accumulated selected development factors.

Age-to-Ultimate St. Dev- This is the estimated factor to provide the standard deviation of ultimate losses when multiplied by the current loss amount.

Estimated Ultimates- The estimated ultimate given the current valuation and selected development factors are presented in this row.

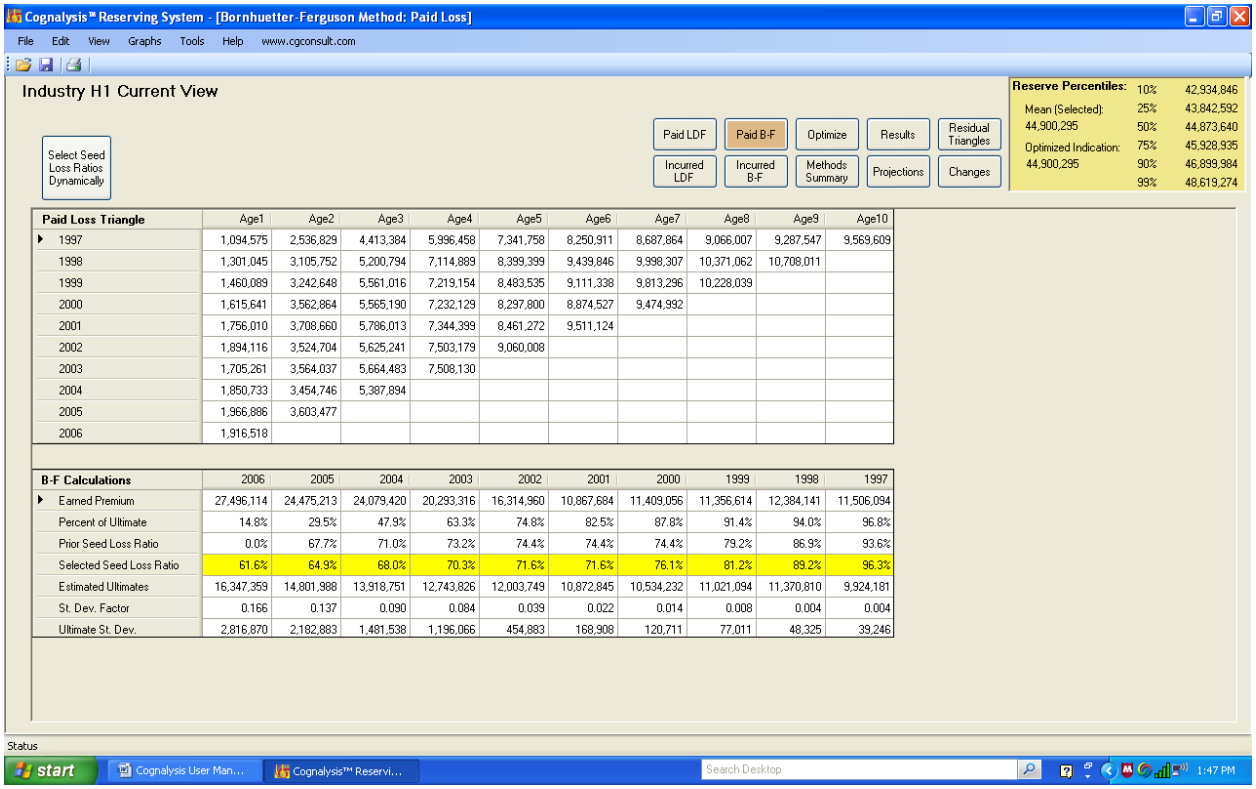
Ultimate St. Dev- This row provides the estimated standard deviation of the ultimate loss.

3.2 Incurred LDF

Users can review and adjust the Incurred Loss Development Factor method by selecting the Incurred LDF button in the upper right part of the screen. The layout and functionality of this section is exactly like that of the Paid LDF section. Please refer to the Paid LDF section above for further explanations.

3.3 Paid B-F

Users can review and adjust the Paid Bornhuetter-Ferguson method by selecting the Paid B-F button in the upper right part of the screen. As in the Paid LDF section, the Paid Loss Triangle is shown at the top of this section. Below the triangle, the B-F calculations are listed. Each row in this calculation area is described below.

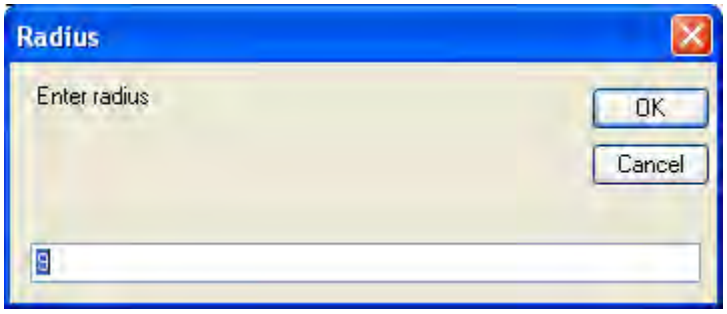


Earned Premium-The earned premium or exposure that the user imported into the system will be shown in this row. If the user imported or entered a zero value for premium or exposure, this row will show zeroes but will use a value of 0.001 for calculations. The user may edit premium or exposure by double-clicking any premium cell on this page.

Percent of Ultimate- This row shows estimated percent of ultimate based on the selected age-to-ultimate factor in the Paid LDF section of the analysis. The Age 1 percent of ultimate will be equal to 1/(Age 1 Age-to-Ultimate value).

Prior Seed Loss Ratio- If a prior analysis file was retrieved, this row will show the seed loss ratio used in the prior analysis. If a prior analysis file was not retrieved, this row will be blank.

Selected Seed Loss Ratio- The user has the option of typing (or copying) in seed loss ratios or using the "Select Seed Loss Ratios Dynamically" option. If the user chooses the "Select Seed Loss Ratios Dynamically" button located in the upper left quadrant of the screen, the user will be prompted to enter a radius as shown in the print screen on the next page.



This radius is defined as the number of periods before and after the evaluated period to be used in estimation of the seed loss ratio for that period. The Cognalysis™ Reserving System will use the minimum variance weighting of paid link ratio and incurred link ratio estimated ultimate losses for the entire period specified by the radius. The default value for the radius is determined as that radius which minimizes the variance of the total reserve estimate. The outcome for this process will change each time new loss development factors are selected. The selected seed loss ratios will only update if you press the "Select Seed Loss Ratios Dynamically" button.

Estimated Ultimates- This row provides the estimated ultimate given the seed loss ratio. The estimated ultimate is calculated for each age as (1-Percent of Ultimate)*Premium*Seed Loss Ratio +Cumulative Loss.

St. Dev. Factor- This is the factor that when applied to the seed ultimate (premium * seed loss ratio) gives the estimated standard deviation for the ultimate loss.

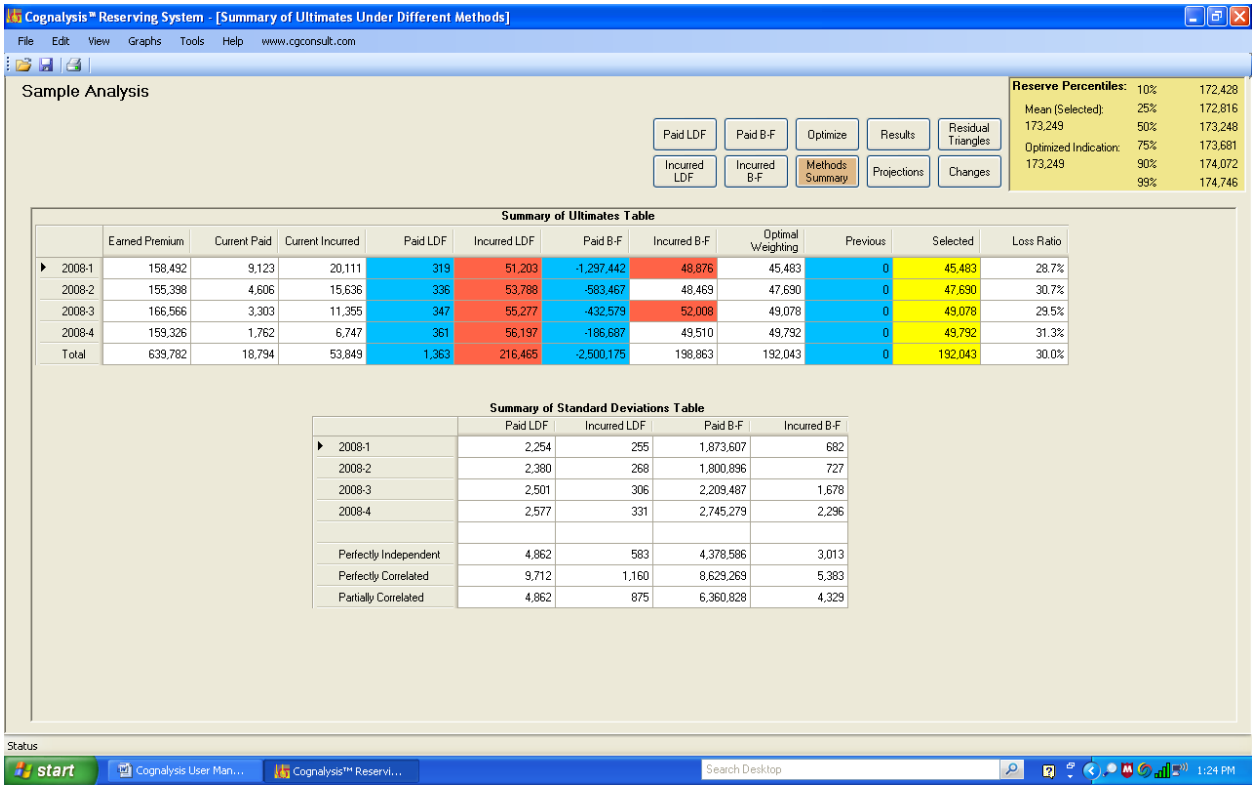
Ultimate St. Dev.- This row provides the estimated standard deviation of the ultimate loss.

3.4 Incurred B-F

Users can review and adjust the Incurred Bornhuetter-Ferguson method by selecting the Incurred B-F button in the upper right part of the screen. The layout and functionality of this section is exactly like that of the Paid B-F section. Please refer to the Paid B-F section above for further explanations.

4.0 Selecting Ultimates

Users can review indications and select ultimates in the Methods Summary section shown below by selecting the Methods Summary button in the upper right part of the screen.



Summary of Ultimates Table

	Earned Premium	Current Paid	Current Incurred	Paid LDF	Incurred LDF	Paid B-F	Incurred B-F	Optimal Weighting	Previous	Selected	Loss Ratio
2008-1	158,492	9,123	20,111	319	51,203	-1,297,442	48,876	45,483	0	45,483	28.7%
2008-2	155,398	4,606	15,636	336	53,788	-583,467	48,469	47,690	0	47,690	30.7%
2008-3	166,566	3,303	11,355	347	55,277	-432,579	52,008	49,078	0	49,078	29.5%
2008-4	159,326	1,762	6,747	361	56,197	-186,687	49,510	49,792	0	49,792	31.3%
Total	639,782	18,794	53,849	1,363	216,465	-2,500,175	198,863	192,043	0	192,043	30.0%

Summary of Standard Deviations Table

	Paid LDF	Incurred LDF	Paid B-F	Incurred B-F
2008-1	2,254	255	1,873,607	682
2008-2	2,380	268	1,800,896	727
2008-3	2,501	306	2,209,487	1,678
2008-4	2,577	331	2,745,279	2,296
Perfectly Independent	4,862	583	4,378,586	3,013
Perfectly Correlated	9,712	1,160	8,629,269	5,383
Partially Correlated	4,862	875	6,360,828	4,329

For each period, the current data is shown (Earned Premium, Paid and Incurred). The indicated ultimate from each of the four methods as well as a blended estimate intended to minimize variance (optimal weighting) is also shown. If a previous analysis file was retrieved the previous ultimates will be shown otherwise the previous column will contain zeroes. The user can type in a selected ultimate value, double click on a single cell for a given period to use that value as the ultimate for that period or double click on a column to use that method as the ultimate for all periods. The implied loss ratio is supplied in the last column. If Premium was not entered into the model, a value of one is used for loss ratio calculations. Individual cells for various indications that highlighted in Deep Sky Blue are more than 5% below the selected ultimate for that period while cells highlighted in Tomato Red are more than 5% higher than the selected ultimate for that period.

Below the Summary of Ultimates Table, the standard deviations of reserves by period are shown for each of the four methods. Standard deviations for all years for each method are also provided assuming three different scenarios of correlations between years (perfectly independent, perfectly correlated and partially correlated).

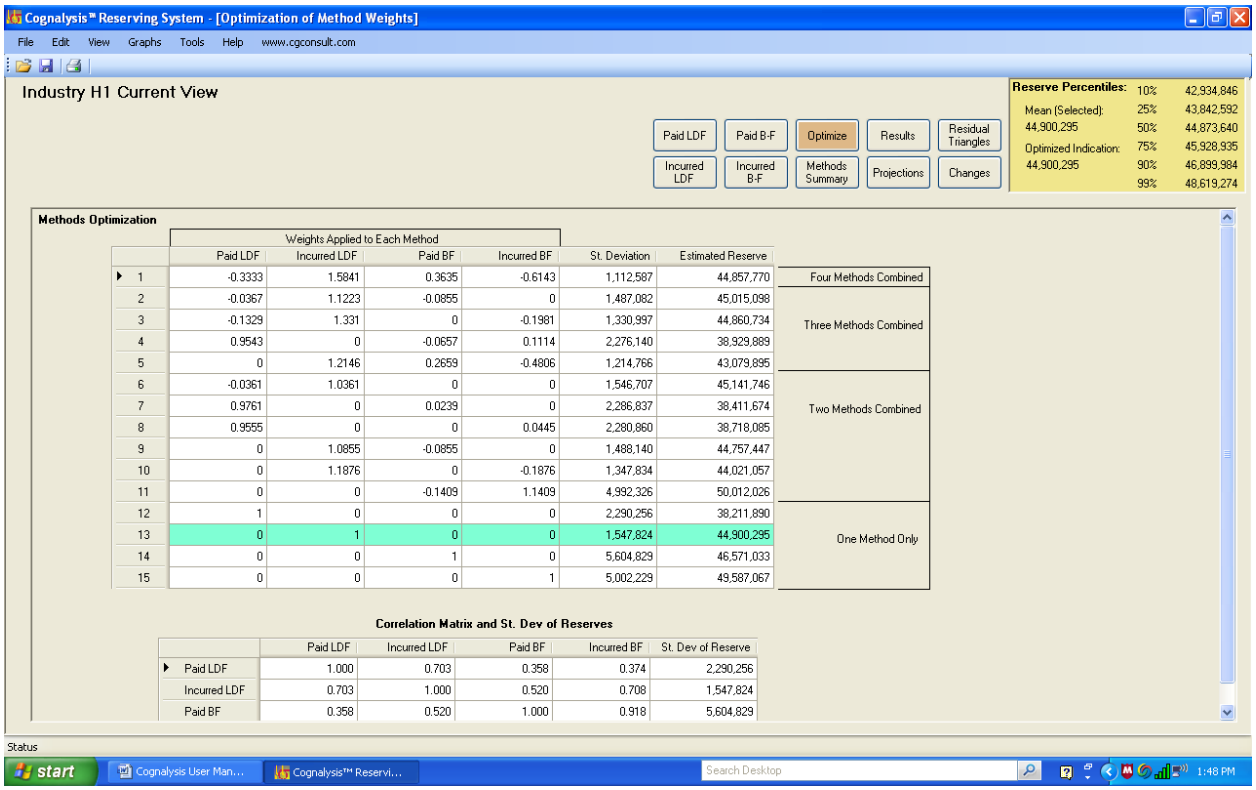
5.0 Reviewing Diagnostics and Reports

Cognalysis offers a variety of diagnostics and reports to help the user refine the analysis being performed. The diagnostics include graphs and summaries of the optimization routine, results, projections, residuals, changes and reserve percentiles. A description of each of the available options is described below.

5.1 Optimization Metrics

The Cognalysis™ Reserving System provides valuable insight into the different levels of variability of reserve methods arising from using each of the four basic methods of loss development. It also develops a blended estimate which reflects the potential for diversification across these methods to reduce the overall uncertainty.

Users can review the details of this analysis as shown below by selecting the Optimize button in the upper right part of the screen.



The four common methods discussed above (the Paid Loss Development, Incurred Loss Development, Paid Bornhuetter-Ferguson, and Incurred Bornhuetter-Ferguson methods) are used to determine the optimal weighted estimated ultimate.

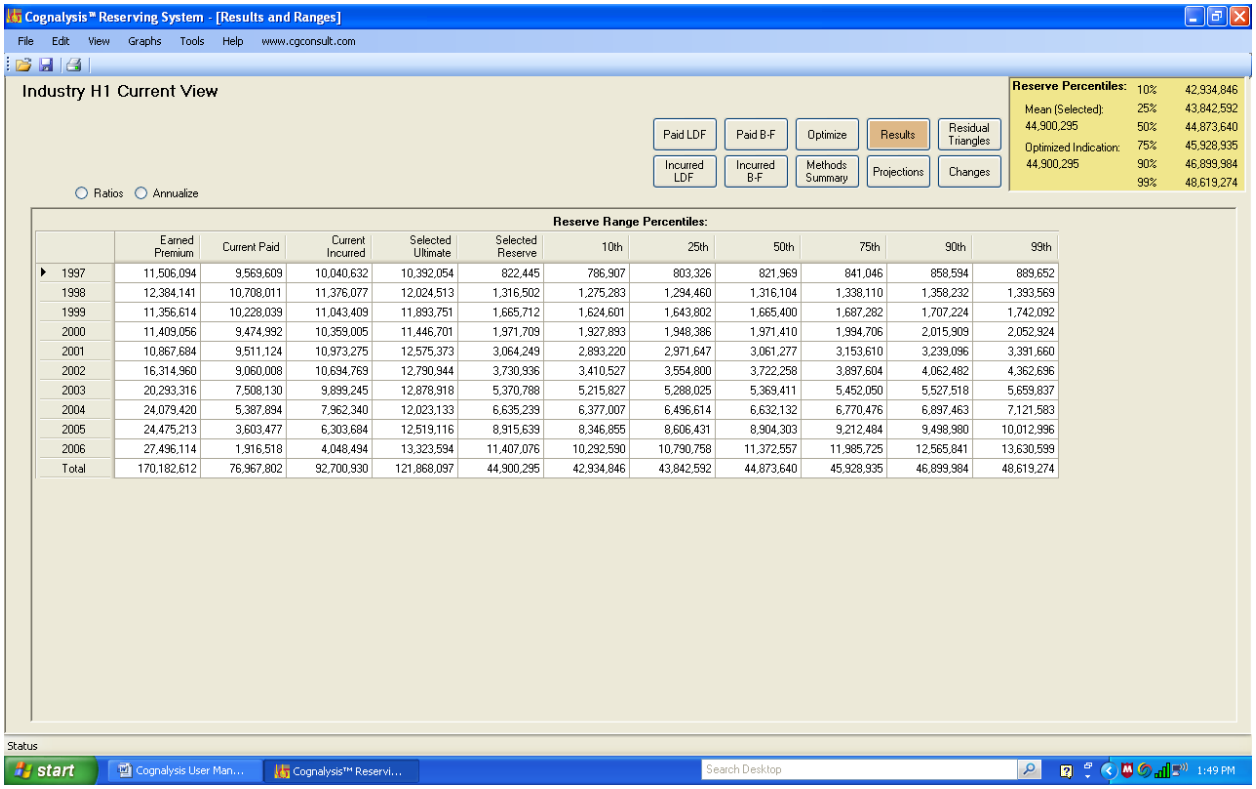
Given the standard deviation of the reserve using each method, and the correlations matrix for these methods (both shown at the bottom of the screen), weights can be found that minimize the variance of the combined estimate. The result is the first row of the Weights table. These weights have the potential

to be negative for individual methods. While negative factors are an interesting result that bears some consideration, the Cognalysis™ Reserving System does not allow them for the minimum variance weighting it ultimately uses. The remaining 14 rows show the systematic determination of the minimum variance *non-negative* weighting. Rows 2-5 eliminate one of the methods each and optimizes. Rows 6-11 eliminate two of the methods each and optimizes. Rows 12-15 eliminate three of the methods each and optimizes. The weighting that is used is the one that minimizes the variance among those with only non-negative values.

For more information about this technique please see:
www.cgconsult.com/docs/MinVarianceReserves.pdf

5.2 Summary of Results

Users can review the selected ultimate, selected reserve and reserve range percentiles (10th, 25th, 50th, 75th, 90th and 99th) in the Results section shown below by selecting the Results button in the upper right part of the screen.



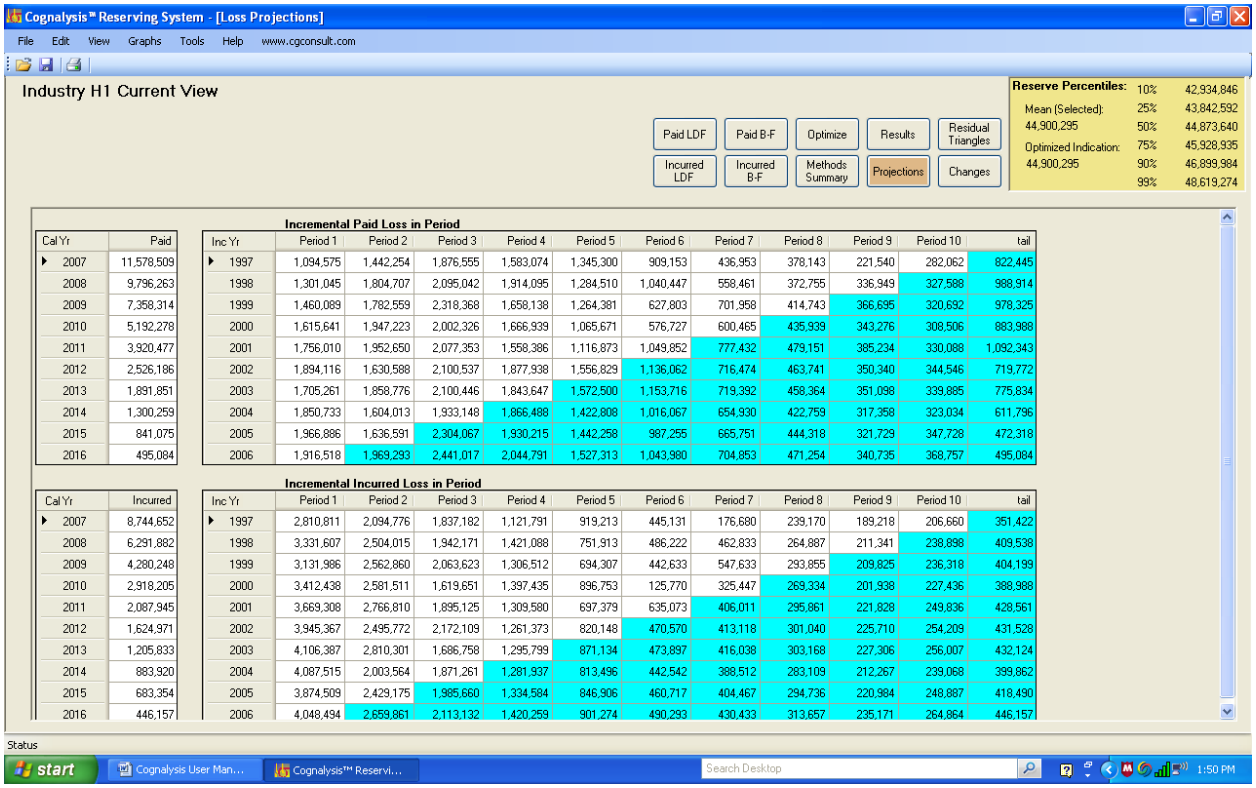
Radio buttons are available above the table on the left to choose a ratio view or to annualize the values if a monthly or quarterly analysis was performed.

5.3 Projected Losses

The Cognalysis™ Reserving System provides projections of both paid and incurred losses. These projections:

- Tie to the selected accident year ultimate losses (both for paid and incurred)
- Are based on weighted projections of intermediate period loss from the four basic methods (Paid LDF, Paid BF, Incurred LDF, Incurred BF).
- Rely on past variability by development period to reconcile between method projections, and selected values.

Users can review the projected paid and incurred losses in the Projections screen by selecting the Projections button in the upper right area of the screen.



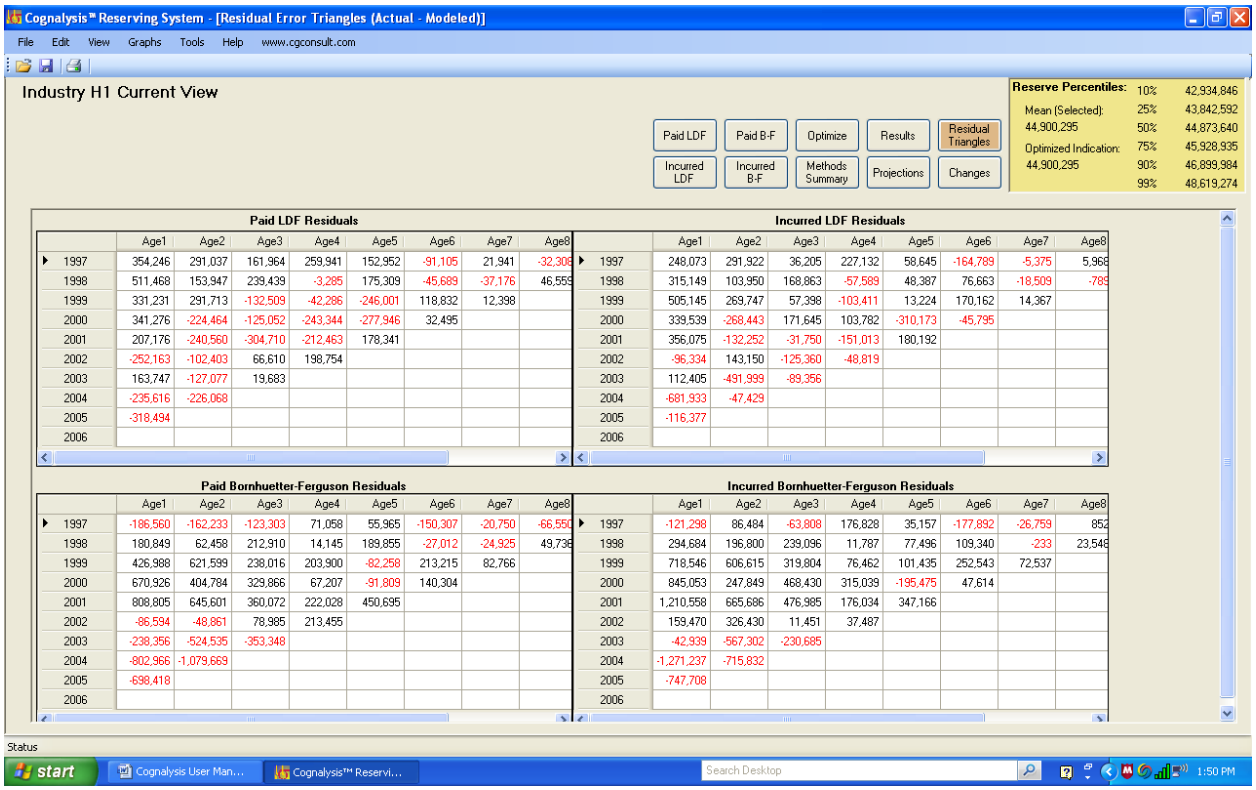
On the left side of the screen the projected calendar year payments and incurred loss changes are shown for the number of periods in the future as was provided for history. These values are the sum of the each new diagonal added to complete the squared triangle.

To the right of the calendar period projections, the squared triangle is provided. The projected payments and incurred losses are shown by incurred period and development period (shown with aqua shading).

5.4 Residual Triangle

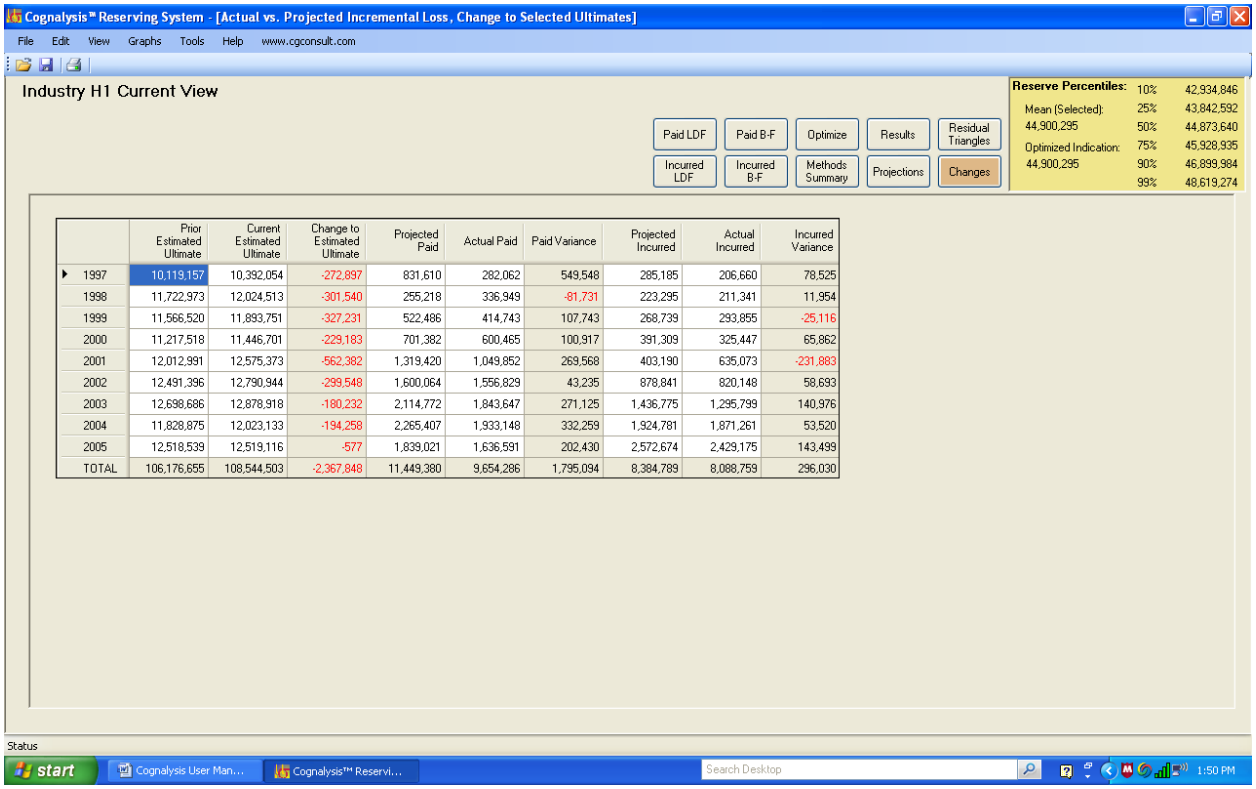
It can be useful when reviewing reserve analyses to consider the residual errors observed from applying current parameters to past development. Patterns observed in these residual triangles may suggest changes to selected parameters are needed.

The residual triangles can be viewed by selecting the Residual Triangle button in the upper right area of the screen. The residuals are provided for each method and older ages can be viewed by using the scroll bar at the bottom of each method.



5.5 Changes in Ultimate Loss Estimates and Actual vs. Projected

The change in estimated ultimate and the actual paid and incurred loss compared to expected can be viewed by selecting the Changes button in the upper right area of the screen. If a previous analysis is retrieved at the start of the analysis, for all but the most recent year change in selected ultimate is shown by period. Also, based on the projected payments and incurred losses from the previous analysis the variance of actual versus projected is provided. If a previous analysis is not retrieved, the prior estimated ultimate and projected losses will be zero.



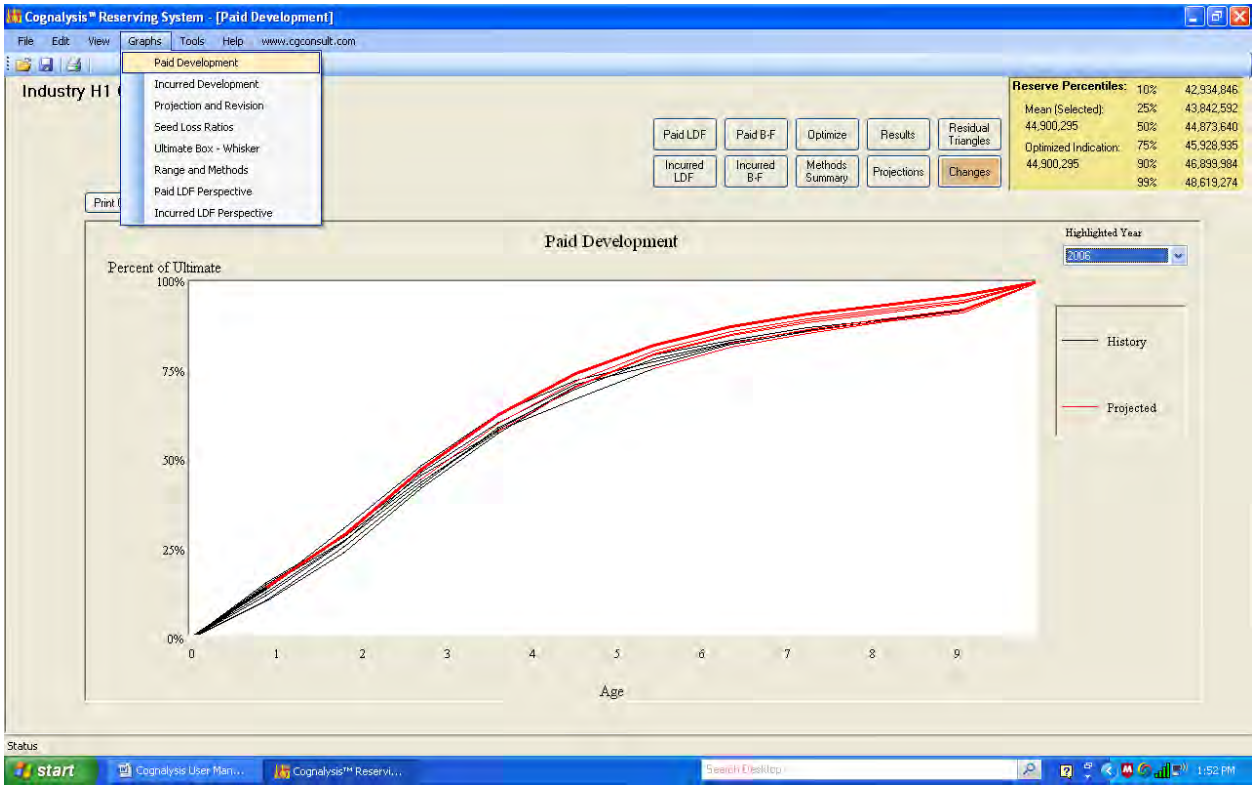
	Prior Estimated Ultimate	Current Estimated Ultimate	Change to Estimated Ultimate	Projected Paid	Actual Paid	Paid Variance	Projected Incurred	Actual Incurred	Incurred Variance
1997	10,119,157	10,392,054	-272,897	831,610	282,062	549,548	285,185	206,660	78,525
1998	11,722,973	12,024,513	-301,540	255,218	336,949	-81,731	223,295	211,341	11,954
1999	11,566,520	11,893,751	-327,231	522,486	414,743	107,743	268,739	293,855	-25,116
2000	11,217,518	11,446,701	-229,183	701,382	600,465	100,917	391,309	325,447	65,862
2001	12,012,991	12,575,373	-562,382	1,319,420	1,049,852	269,568	403,190	635,073	-231,883
2002	12,491,396	12,790,944	-299,548	1,600,064	1,556,829	43,235	878,841	820,148	58,693
2003	12,698,686	12,878,918	-180,232	2,114,772	1,843,647	271,125	1,436,775	1,295,799	140,976
2004	11,828,875	12,023,133	-194,258	2,265,407	1,933,148	332,259	1,924,781	1,871,261	53,520
2005	12,518,539	12,519,116	-577	1,839,021	1,636,591	202,430	2,572,674	2,429,175	143,499
TOTAL	106,176,655	108,544,503	-2,367,848	11,449,380	9,654,286	1,795,094	8,384,789	8,088,759	296,030

5.6 Reserve Percentiles

As can be seen on all screen views in the user manual, the reserve percentiles for all periods combined is provided in the upper right corner of the analysis at all times. This summary contains the mean (selected) reserve, the optimal indicated reserve and the reserve at 6 different percentiles. This gives the user a status of the analysis that can be viewed at all times regardless of which specific screen the user may be viewing.

5.7 Graphs

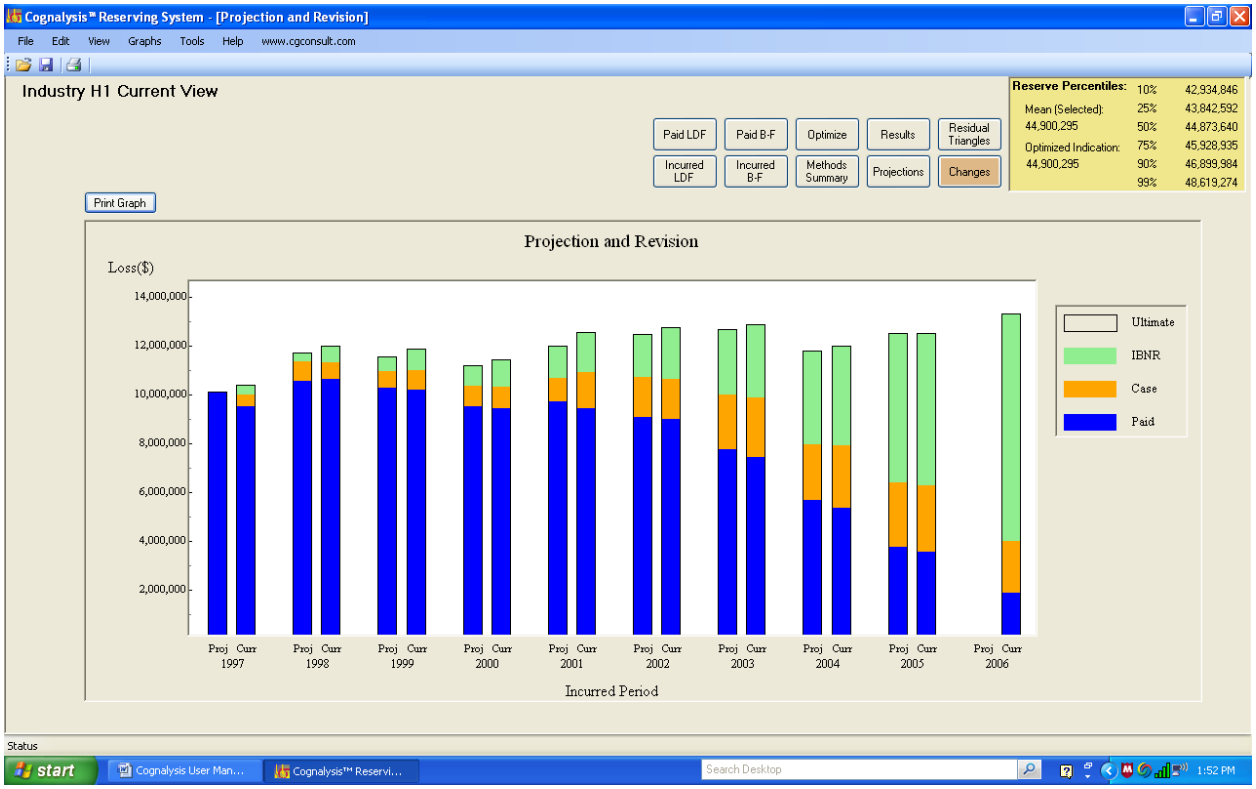
Eight main categories of graphs are available for the user to view and print. The graphs can be accessed at any time by selecting the desired graph option from the Graph menu at the top of the screen. A description of each graph type is provided below.



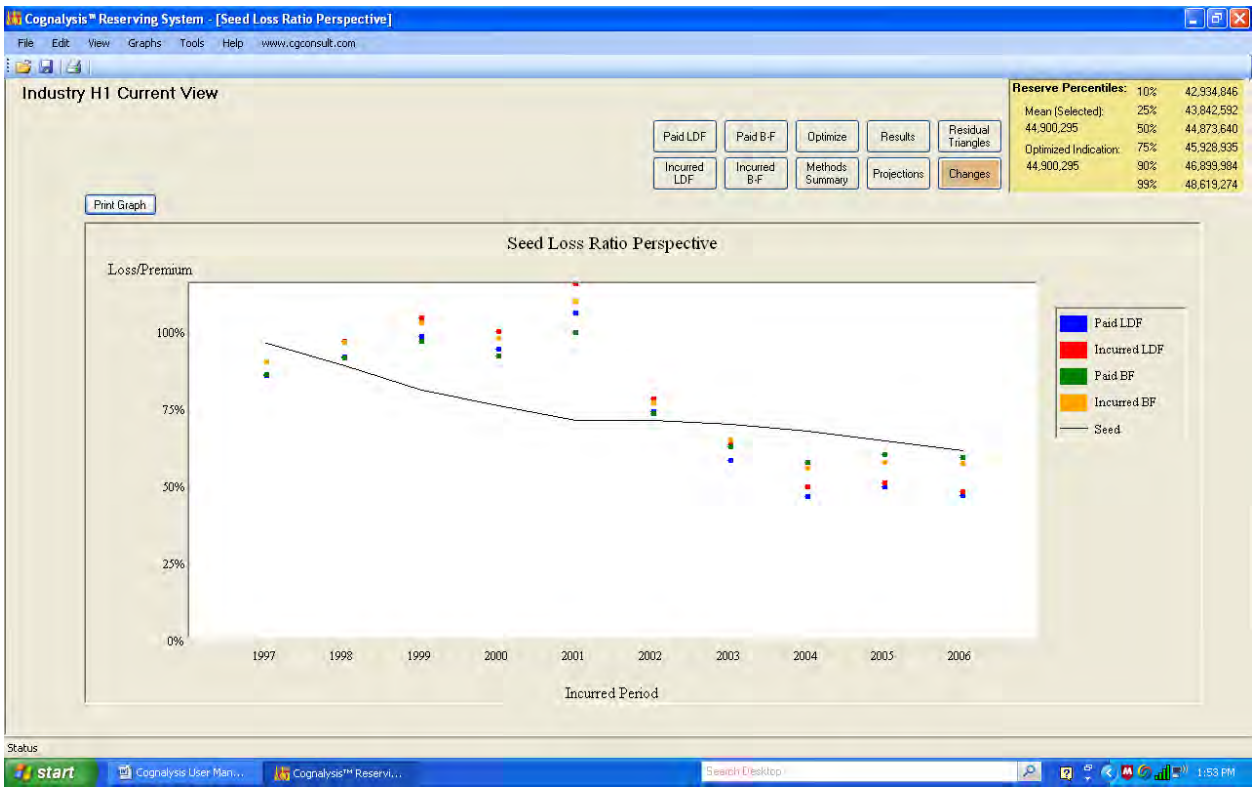
Paid Development – This graph (shown above) shows the paid as a percent of ultimate at each age for the periods reviewed based on the selected ultimate and projected losses. The historical portion of each line is black while the projected portion is red. The user can select a specific period to be highlighted (bold) from the drop down menu on the right. The "up" and "down" arrow keys on the keyboard will also scroll the user through the different accident periods.

Incurred Development – Like the paid development graph, the incurred development graph shows the reported as percent of ultimate at each age for the periods reviewed based on the selected ultimate and projected losses. The historical portion of each line is black while the projected portion is red. The user can select a specific period to be highlighted (bold) from the drop down menu on the right.

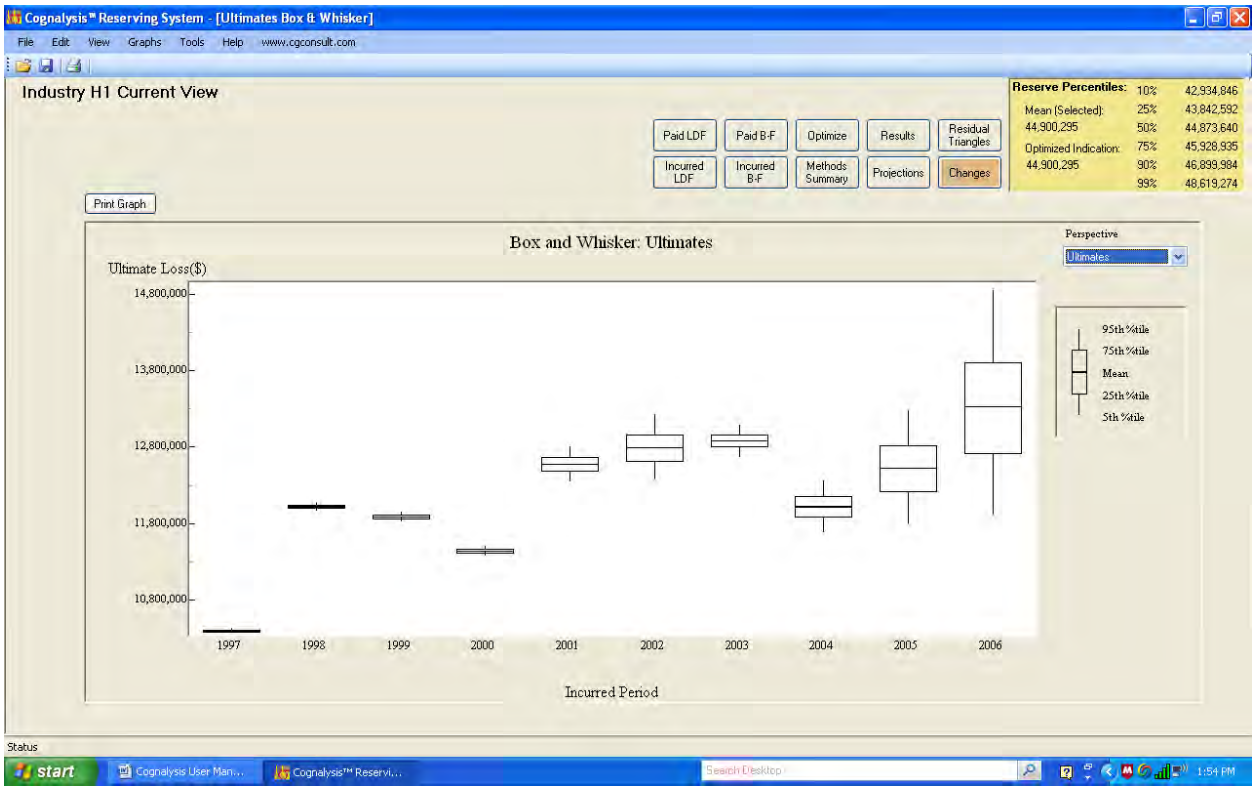
Projection and Revision – This graph (shown on the next page) provides a stacked bar chart that splits the ultimate loss for each period into each of its components (paid loss, case reserve and IBNR with the total bar reflecting the ultimate). If a previous analysis has been retrieved, the prior selected ultimate is also shown, as well as projected values for paid, case, and IBNR reserves to the current point in time. If the user has performed a quarterly or monthly analysis, double-clicking on a bar will show the quarterly or monthly view for that period. Once in this view, the user can return to an annual view by clicking the Back button in the lower right area of the screen.



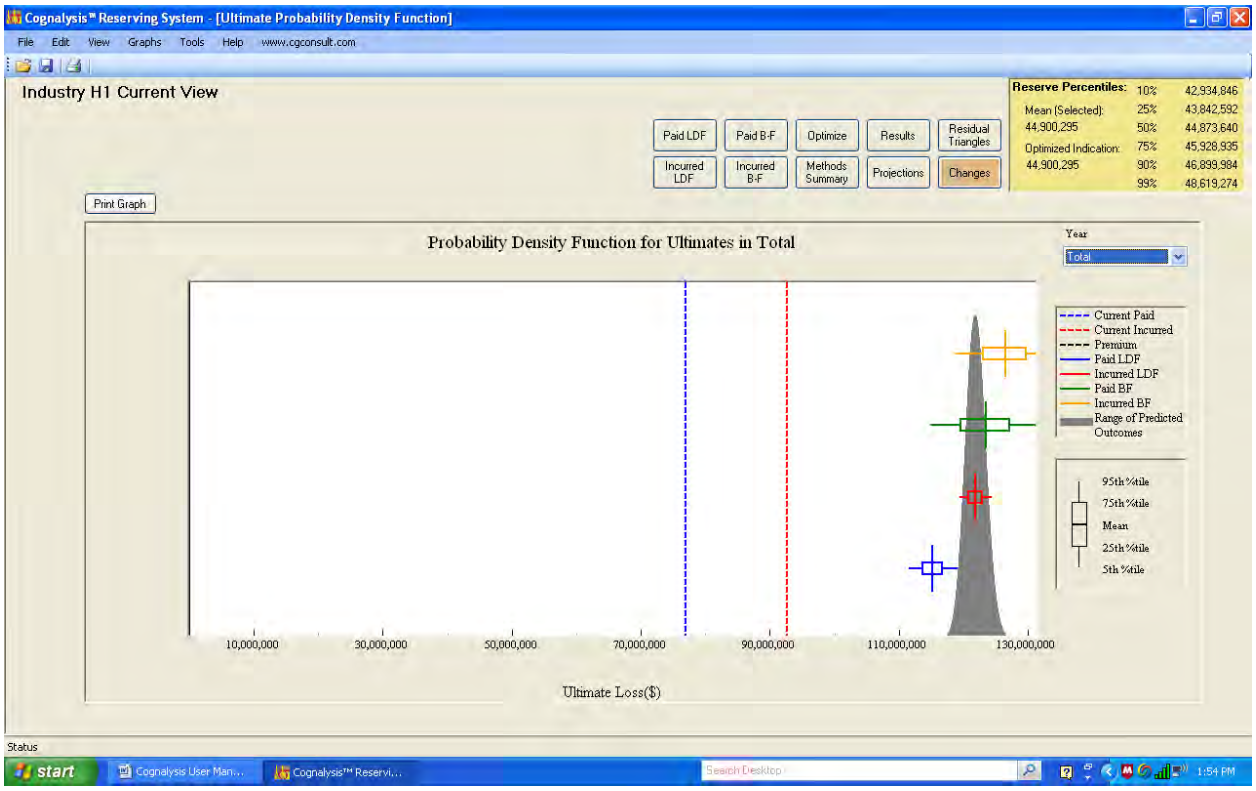
Seed Loss Ratios – This graph (shown below) shows a line with the seed loss ratios as well as the loss ratio implied by each of the four indications for each accident period.



Ultimate Box –Whisker – This graph shows the selected values for each period while also presenting the values at various percentiles. The user can choose to view this graph from a reserve or an ultimate perspective by selecting one of those two options from the drop down menu to the right of the graph. If the user has performed a quarterly or monthly analysis, double-clicking on a box will show the quarterly or monthly view for that period. Once in this view, the user can return to an annual view by clicking on the Back button in the lower right area of the screen.



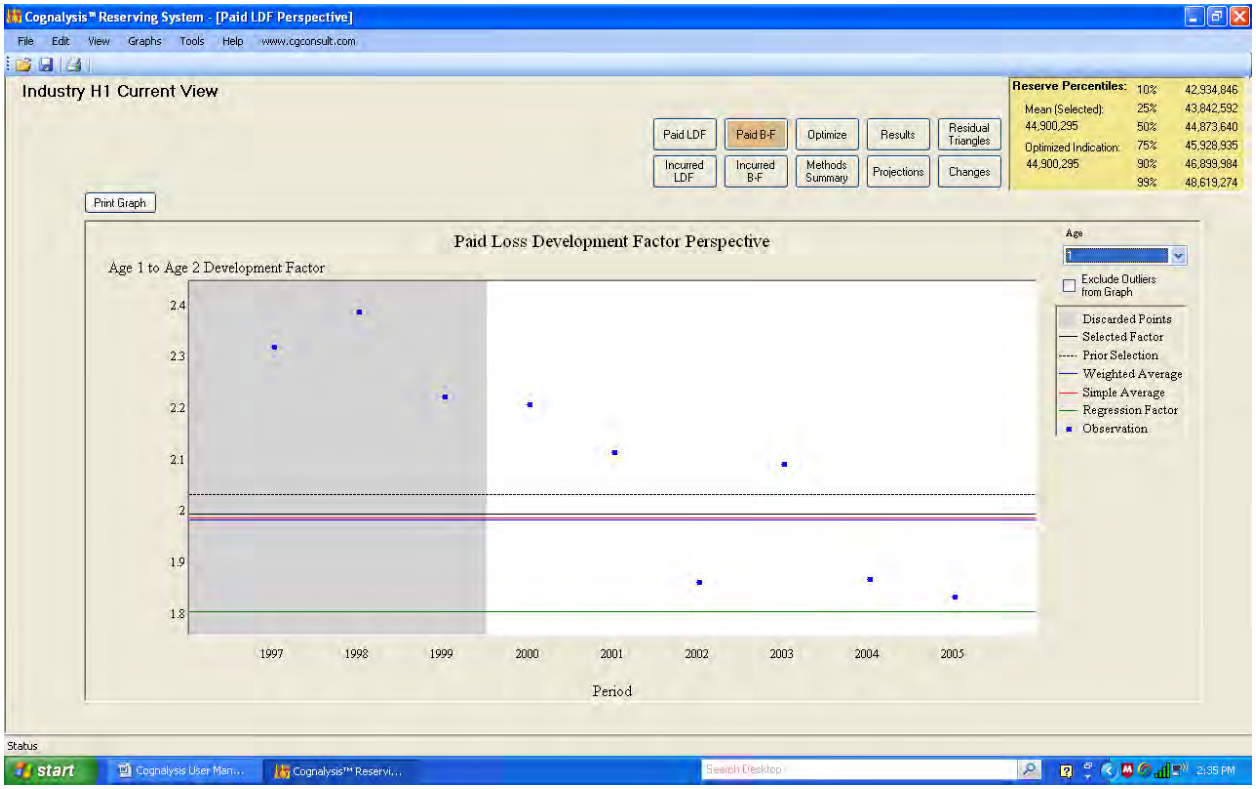
Range and Methods – This graph shows a probability density function for the ultimates. This probability density function is shown in relation to premium, current paid and current incurred values. Box and whisker graphs for each of the four methods are also added to give the user perspective relative to the method indications. The user has the option of choosing to view this graph for all periods or for an individual period by choosing from the drop down menu on the right (or by scrolling through by using the "up" and "down" arrow keys.



Paid LDF Perspective – This graph shows the observed paid development factors for each period for a given age-to-age relative to averages, prior and selected values. The user can select the desired age to view from the drop down menu to the right.

Graphing can become useless when outlier values change the scale. The user may also exclude or include such outliers by checking the box to the right.

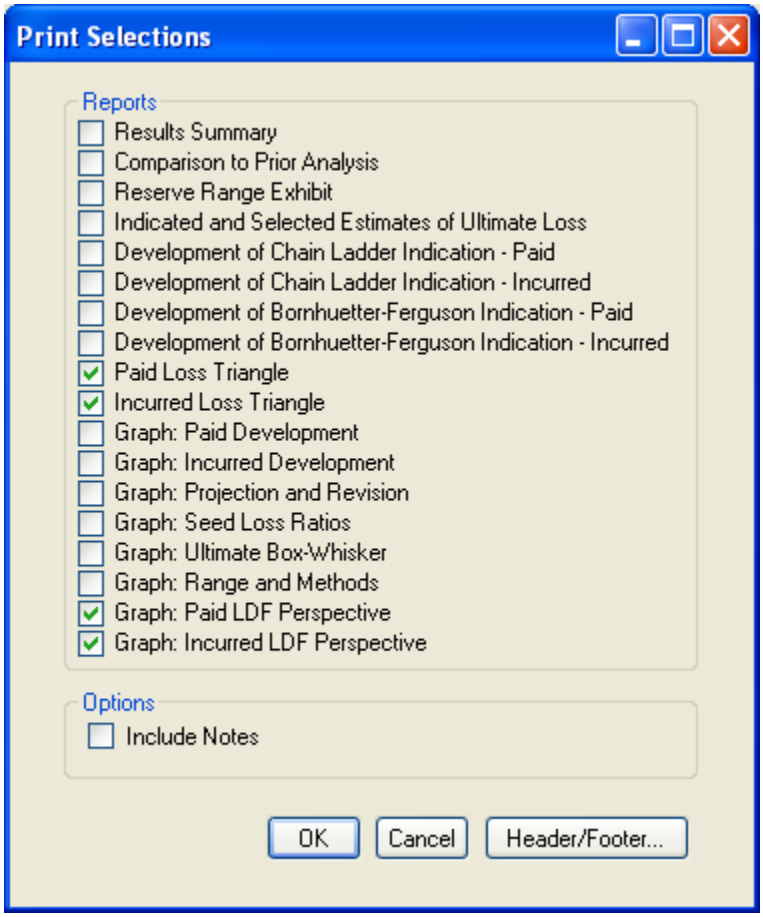
The shaded gray region that highlights the factors that were discarded in order to calculate the simple and weighted averages (see section 4.1). The line representing this cutoff may be moved to the left or right (by clicking and dragging). The lines representing the simple and moving average factors will adjust accordingly (including on the LDF screen), but the selected factor (and associated line) will remain unchanged. The selected factor line may also be moved up or down to a new selected value (NOTE: This will change the selected factor on the LDF pages as well as indications of ultimate loss, projections, etc.).



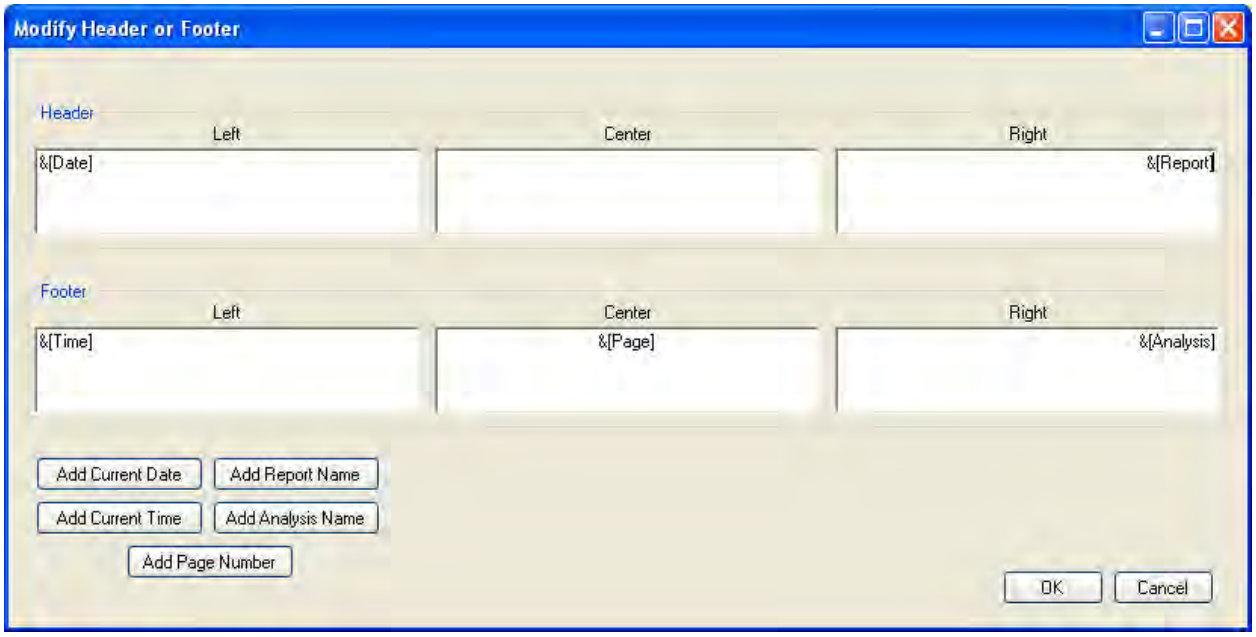
Incurred LDF Perspective – Similar to Paid LDF Perspective, but for Incurred factors.

5.8 Reports

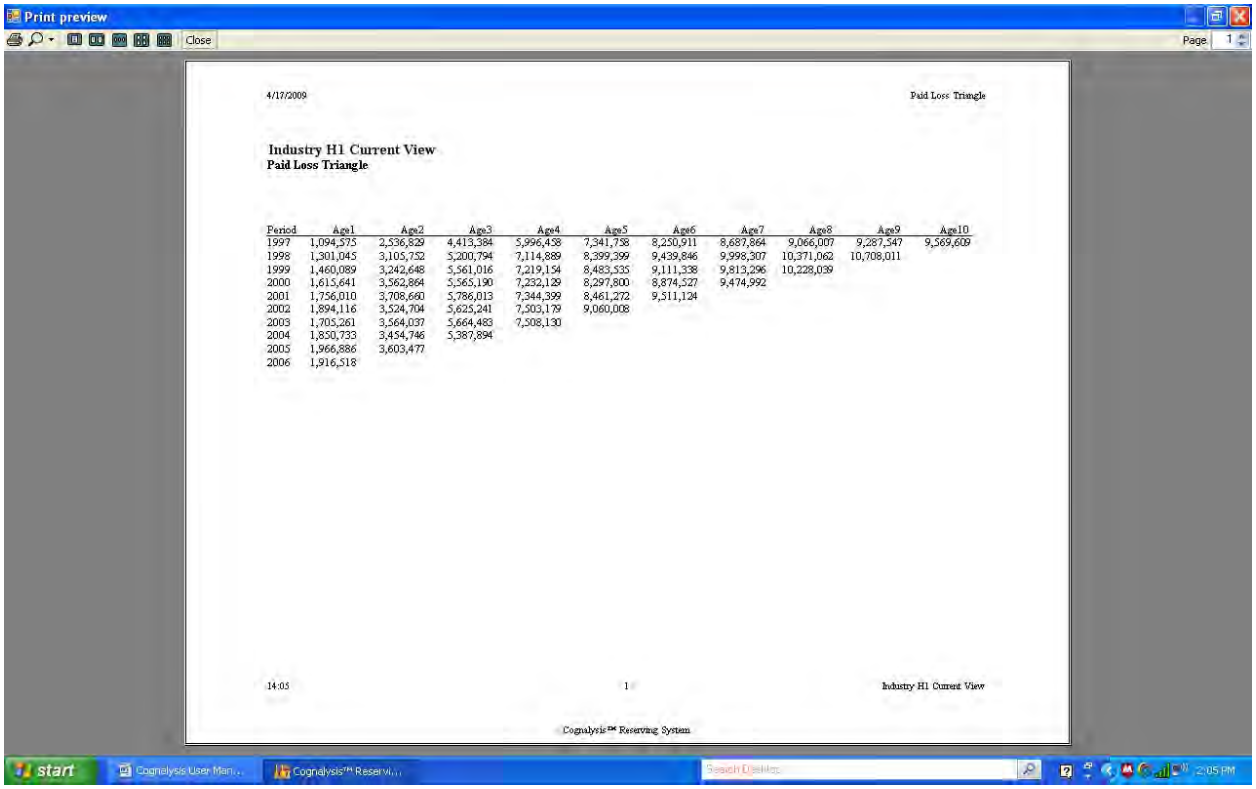
Reports can be printed for each of the main screens and graphs discussed above. To select reports for printing choose Print Setup from the File menu at the top of the screen. The box shown below will appear for the user to check the boxes of the reports to be printed. The user may also choose to print any notes added to the analysis by checking the appropriate box.



The user may also add a Header and/or Footer to the printed reports. After selecting the Header/Footer button from the Print Setup box, the user may type text in any of the header or footer boxes. Alternatively, the user can click in any header or footer box and then select the item they wish to have appear on the report. The options for the header and footer are shown below and include Date, Time, Analysis Name, Report Name and Page Number.

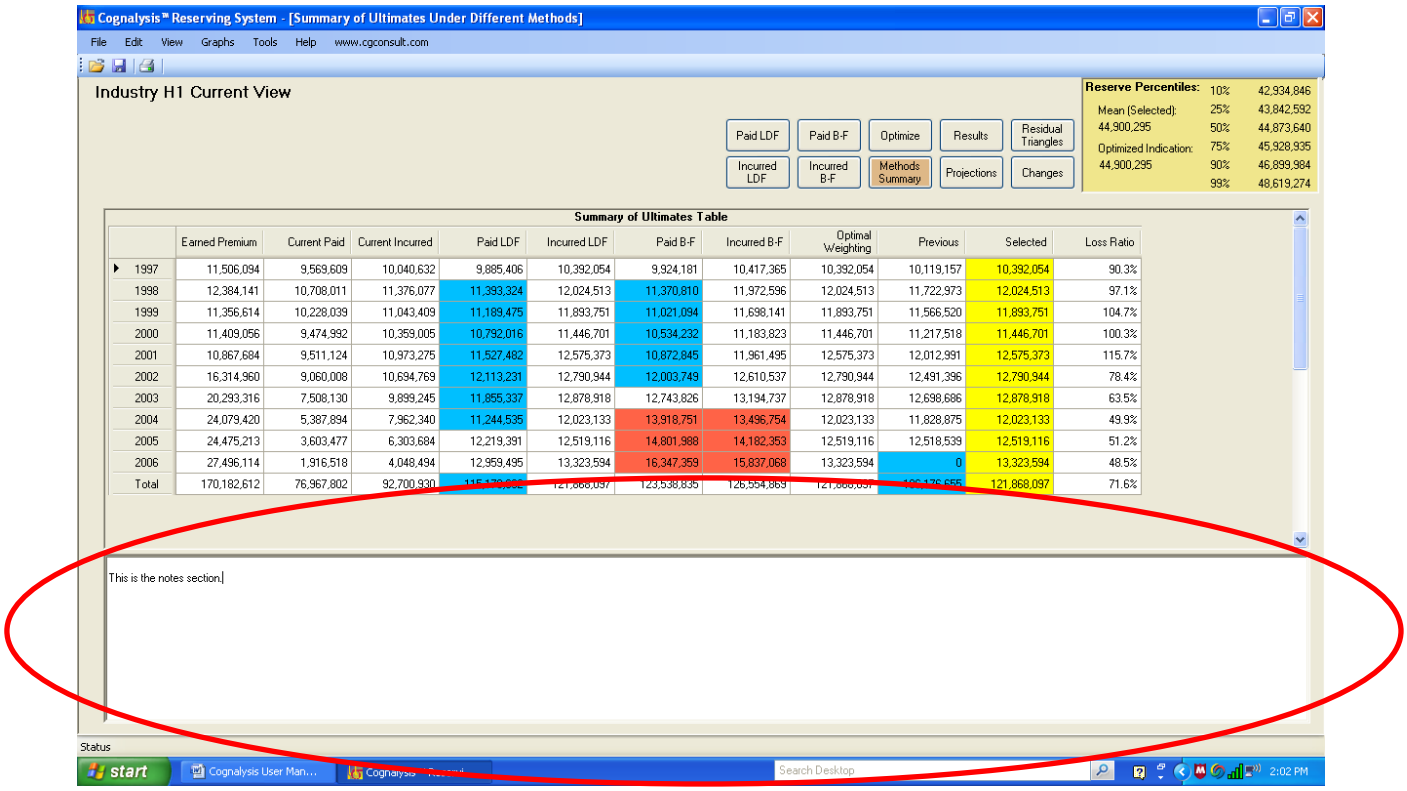


Users can preview the reports by selecting Print Preview from the File menu. On the Print Preview screen the user can adjust the view by selecting from the screen view buttons or page box at the top of the screen. After previewing the reports, the user can print the reports by selecting the printer button or they can close out of print preview by selecting the Close button.



5.9 Notes

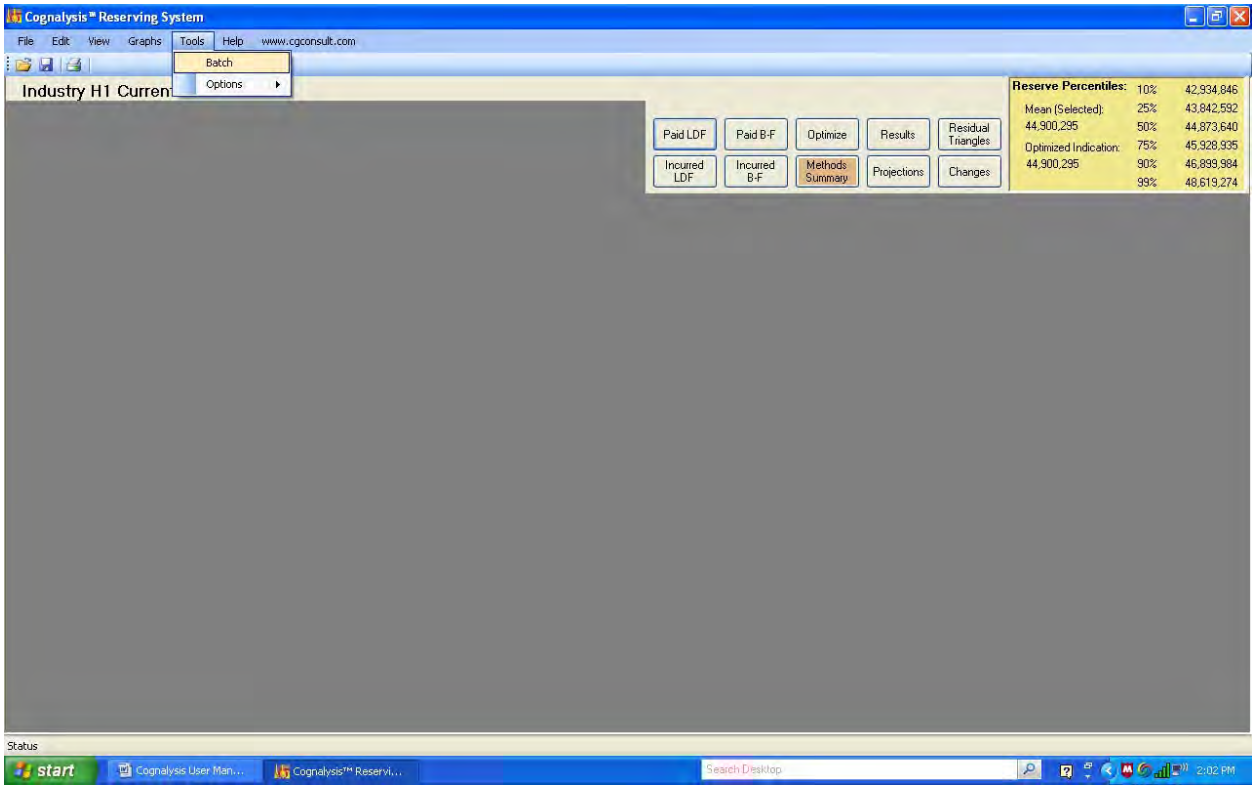
Users can add notes for documentation purposes on each section of the analysis (except graphs). If the user selects Notes from the View menu at the top of the screen a box will appear at the bottom of the screen for the user to type comments into (this area can also be retrieved by selecting CTRL+N). The notes section is shown on the portion of the screen view circled on the following page.



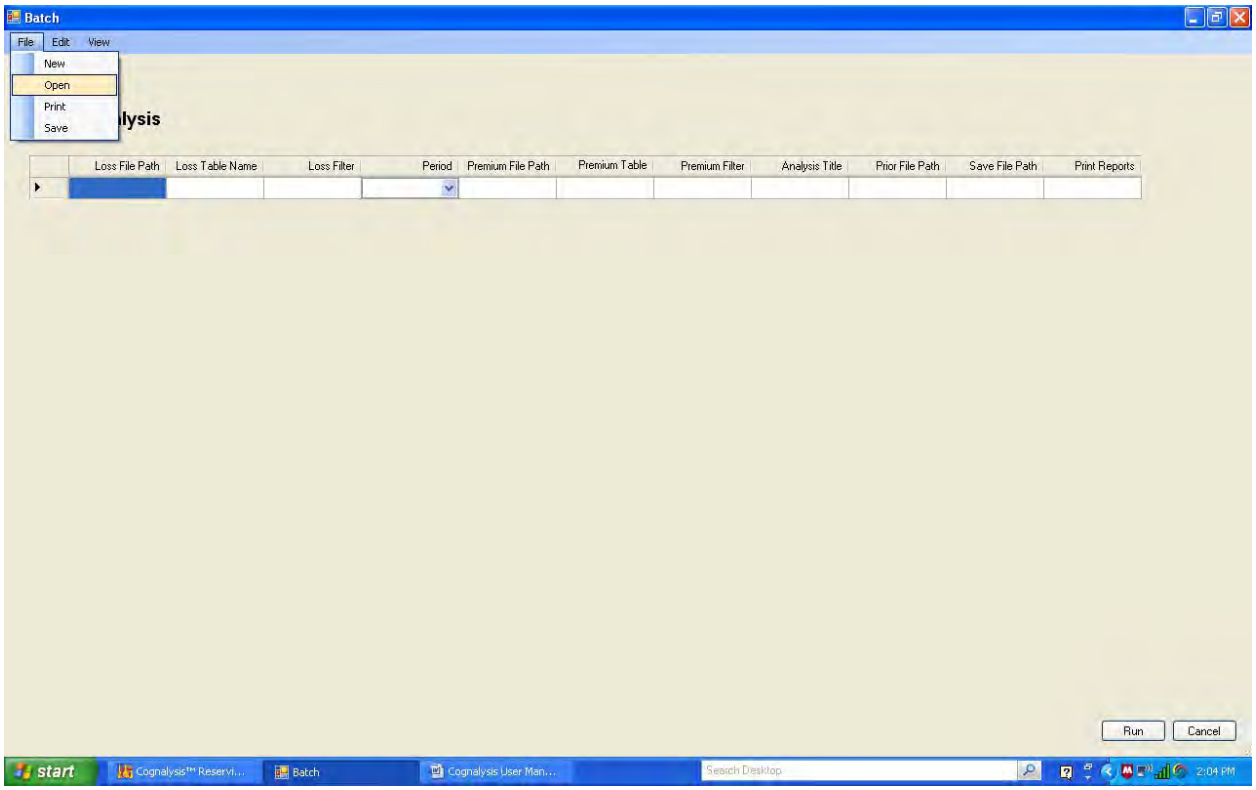
6.0 Batch Processing

In the Cognalysis™ Reserving System, routine triangle processing and report production for a large number of analyses may be done automatically in batch mode. This can provide a useful first draft analysis for large amounts of data, providing you information about where there may be issues for more focused analysis.

In order to build a batch process the user selects the Batch option from the Tools menu at the top of the screen.



After selecting Batch, the user will be taken to a screen where an existing batch process can be opened or a new batch process can be created by selecting one of these options from the File menu at the top of the Batch screen. Once a batch process is created or edited the user can save this process by selecting Save from the File menu to be retrieved for future batch imports.



In building the batch process, the user will enter information in each of the following fields:

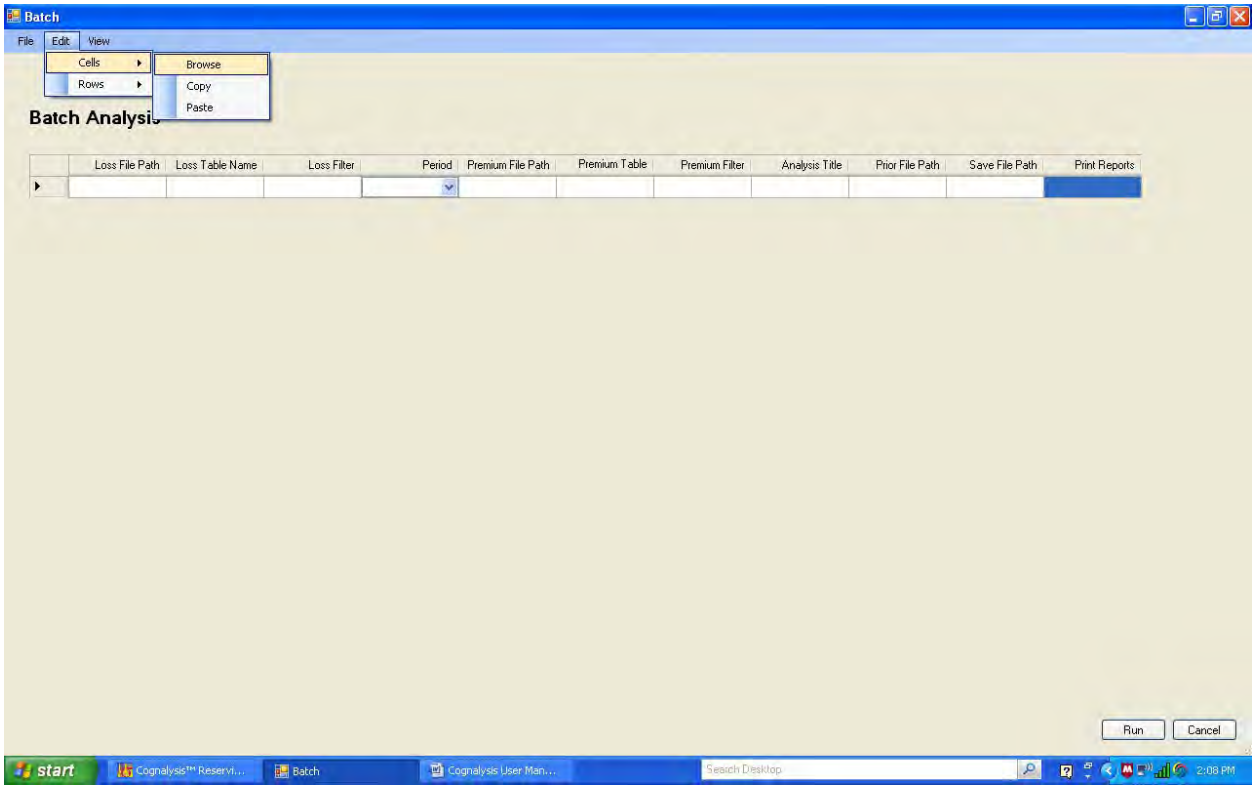
- Loss File Path – the path of where the loss data file is located
- Loss Table Name – the name of the MS Access table that contains the loss information
- Loss Filter – full string text that filters the field values (for example, LOB=Auto and Region=West)
- Period – the length of the period (monthly, quarterly, or annual)
- Premium File Path - the path of where the premium data file is located
- Premium Table – the name of the table that contains the premium information
- Premium Filter – full string text that filters the field values (for example, LOB=Auto and Region=West)
- Analysis Title – the title to be given to this new analysis
- Prior File Path – if any, the location of the previous analysis file
- Save File Path – the path of where this new analysis file should be save
- Print Reports – a list of reports that should be printed upon creating this analysis file

Items in each field (except Period and Analysis Title) can be browsed for by right-clicking in each cell. This will bring up a menu to aid in your selection.

Individual rows can be replicated by right-clicking on the row header of the row to be replicated. In this way a large number of similar entries can be made quickly.

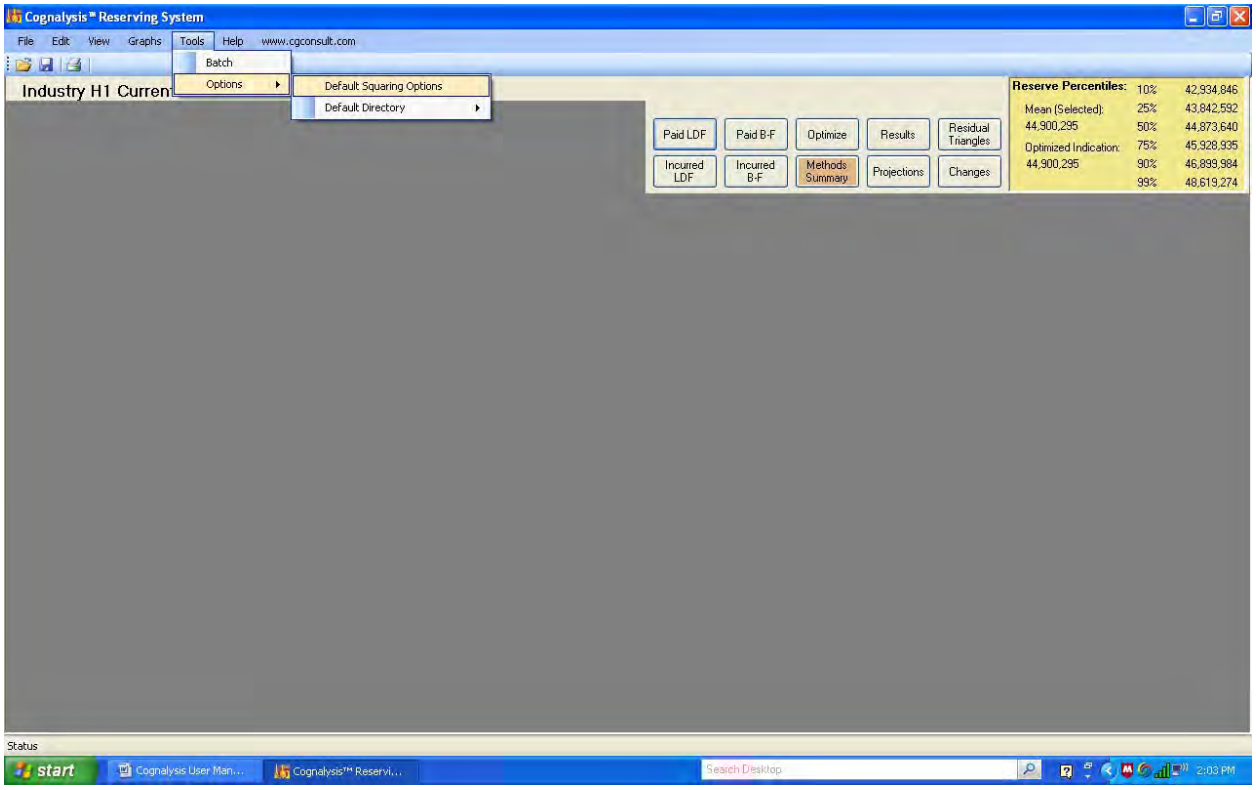
After the batch process has been built, the user can run the process by selecting the Run option in the lower right corner of the screen.

When building or modifying a batch process, the user can use the Edit options from the menu at the top of the screen to target certain rows or cells. These Edit options are also available by right-clicking on a row in the Batch Analysis list.



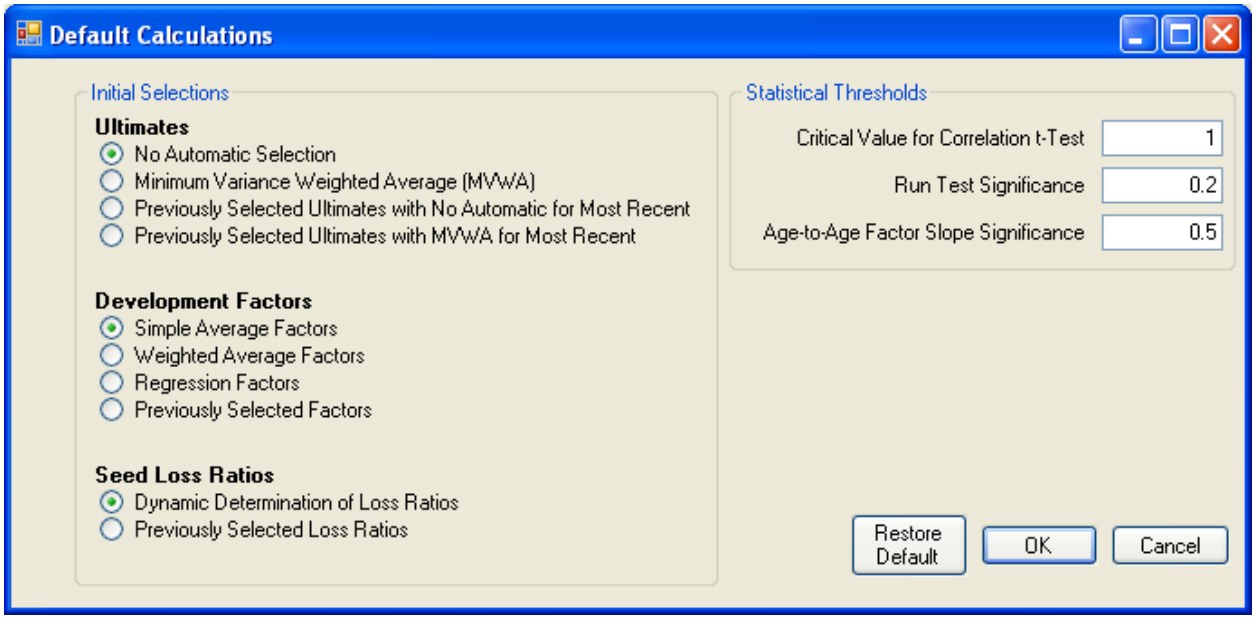
7.0 User Preferences

At any time users can define default squaring options or the default file directories. Users can make changes to these preferences by selecting one of these options from the Options menu under the Tools drop down menu at the top of the screen.



7.1 Default Squaring Options

The Cognalysis™ Reserving System offers a variety of default options when you begin to square triangles. By selecting Default Squaring options from the Tools/Options menu, choices for default calculations are available to the user. Each of the default options is described below.



Ultimates

Users may choose the default ultimate from the following four options:

- **No Automatic Selection** – The ultimate for each period will be zero until the user selects an ultimate value.
- **Minimum Variance Weighted Average** – The ultimate for each period will be the optimized value that combines methods to produce the minimized variance.
- **Previously Selected Ultimates with No Automatic for the Most Recent** – The ultimate for each period will be set equal to the ultimate for the same period from the previous analysis file that has been imported. For the most recent (and therefore new) period, the ultimate will be zero until an ultimate is selected.
- **Previously Selected Ultimates with MVWA for Most Recent** – The ultimate for each period will be set equal to the ultimate for the same period from the previous analysis file that has been imported. For the most recent (and therefore new) period, optimized value that combines methods to minimize variance will be selected.

Development Factors

Users may choose from the following four options for default development factors:

- **Simple Average Factors** – The starting selected development factors default to simple averages of historical factors.

- **Weighted Average Factors** – The starting selected development factors defaults to loss-weighted averages of historical factors.
- **Regression Factors** – The starting selected factors are based on a regression analysis of historical development (with stability adjustments- see Statistical Thresholds section below).
- **Previously Selected Factors** – The starting selected factors will default to the development factors from the previous analysis that has been imported (if available).

Seed Loss Ratios

Users may choose from the following two options for default development factors:

- **Dynamic Determination of Loss Ratios** – The seed loss ratios are calculated using a moving average of the paid and incurred link ratio methods. A radius (number of periods before and after the period) is derived with the goal of determining seed loss ratios that minimize the variance of the reserve estimate.
- **Previously Selected Loss Ratios** – The seed loss ratios will default to the seed loss ratios from the previous analysis that has been imported (if available).

Statistical Thresholds

Some additional parameters guide behavior of particular algorithms within the Cognalysis™ Reserving System:

- **Critical Value for Correlation T-test** – The measured correlations between accident periods are subject to a test for significance of the relationship against a null hypothesis of zero correlation. If the test finds the measured relationship insignificant, zero correlation is used. The default critical value is 1, meaning t-test of values greater than 1 will be seen as significant. You can lower this number to be more sensitive to measured correlation between accident periods or raise it to be more stringent with regard to reacting to these measured correlations.
- **Run Test for Significance—** The default number of periods used in the determination of weighted and simple average development factors is based on run tests to determine whether there are changes in development patterns over time. The sensitivity of these run tests is governed by this parameter, which is the significance level of the test. The default is .5 which means that 50% of the time the test will reject the null hypothesis (no change over time in development factors) even when it is true. You can adjust this parameter lower to be less reactive to changes in development patterns (resulting in longer periods used for the factor averages) or you can raise the parameter to be more reactive to changes in development patterns (resulting in shorter periods used for the factor averages).
- **Age-to-Age Factor Slope Significance—** The regression that can be used to estimate projected loss development factors is governed by this parameter. A significance test is performed on the slope (rate of change in factors over time) determined by the regression. When the slope is found to be statistically insignificant, the result will be a weighted average of factors. When the slope is found to be significant, the result will be a factor that reflects the trend. The greater the slope is relative to its critical value, the more slope will be reflected in the calculated factor. You

can lower the parameter shown in this box to reduce the sensitivity to the observed trend (0 => long term weighted averages are used). You can raise the parameter to increase the sensitivity to the observed trend (1 => the factor completely reflects the observed trend).

7.2 Default Directories

The user can select an existing folder or make a new folder to act as the default directories. A default directory can be chosen for data files, analysis files and system files. Data files are files containing data that will be imported into a new analysis. Analysis files contain a saved analysis (after information has been imported into Cognalysis, parameters and estimates selected, etc.). You can change these default directories to better streamline your data input and output processes.

System files are files that are used by the Cognalysis system such as working files and user preference files. Changes to the system files directory are not recommended.