

ProVal version 3.05 introduces explicit support for MAP-21 pension interest rate stabilization, support for GASB 67/68, 2D mortality improvement scales, and many other features listed below.

US Qualified Pension Plans

- ◆ **Pension Interest Rate Stabilization** enacted by MAP-21 can now be handled with a single run.
 - Valuation Assumptions now allow for two sets of segment interest rates, Funding and Max Tax. Valuations and Core Projections calculate UC Not-at-Risk and At-Risk liabilities using the Funding interest rates and PUC and UC Not-at-Risk and At-Risk liabilities using the Max Tax interest rates. These liabilities then appropriately flow through to Valuation Sets (eliminating the need for version 3.04's "2012 Pension Funding Stabilization" event) as well as Deterministic and Stochastic Forecasts.

	Funding	Max Tax
1st segment:	0.0554	0.0554
2nd segment:	0.0685	0.0685
3rd segment:	0.0752	0.0752

- In Asset & Funding Policies, the credit balances can be waived to meet an FTAP based on the Max Tax liabilities to assist in avoiding the 4010 filing.
- In a Stochastic Forecast, ProVal can now automatically determine the stabilized interest rates for minimum funding.
- ◆ **PBGC Premium.** If PBGC liabilities are available, the PBGC premium will be calculated even if it is not paid out of plan assets.

US Public Pension Plans

- ◆ **GASB 67/68.** U.S. Public Pension mode now supports GASB 67/68. Accounting runs calculate the Entry Age Normal Liability and the Asset & Funding Policies include accounting parameters. For more, see [GASB Statements No. 67 and 68](#) on page 15.

Mortality Tables

- ◆ **Linked mortality tables.** You can create a mortality table that combines pre- and post-commencement rates and improvement scales from different tables (and apply a setback or scaling factor to the base rates). This allows you to combine tables in an easy, documented way that requires no manual entry and can be reviewed with ease.
- ◆ **2D mortality improvement scales.** A new Mortality Improvement Scales library lets you manage improvement scales separately from mortality rates. What's more, it supports "2D" improvement scales (that vary by age and calendar year), input either as annual reductions or cumulative factors. Scales BB and BB2D have been added to the library automatically.

Mortality Improvement Scales Library	
Name	Modified
Scale AA	1/01/2000 12:00 AM
Scale BB	9/14/2012 1:02 PM
Scale BB2D (RPEC Q&A A3)	9/14/2012 1:02 PM
Scale D	1/01/1971 12:00 AM
Scale H	1/01/1983 12:00 AM

- ◆ Mortality tables can apply separate improvement scales (and base years) to pre- and post-commencement mortality rates.

Apply Improvement Scale

Pre-Commencement: CMI 2011 1.25% Base year: 2002

Post-Commencement: CMI 2011 2.50% 2002

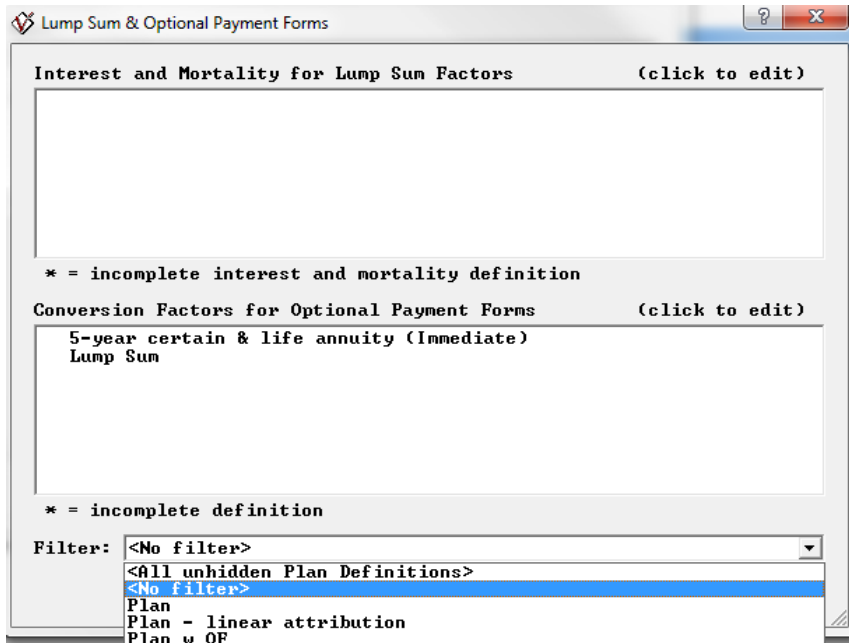
Projection: Fully generational To year

For more on the above bullets, see [Mortality Enhancements](#) on page 21.

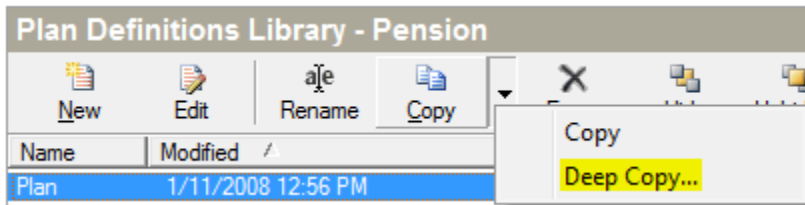
- ◆ If a mortality table or improvement scale is locked, it will be stated in the View.

Interface

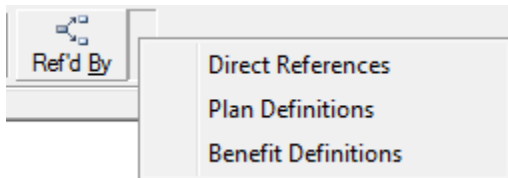
- ◆ **Plan filters.** In Valuation Assumptions and Projection Assumptions, a Plan Filter (Promise Filter in German mode) lets you see only relevant entries in the topics for Lump Sum and Optional Payment Forms, Post-Decrement Probabilities, Cost of Living Adjustments (COLAs), and Plan Amendments. If you edit the assumptions via a Valuation or Core Projection, ProVal will pre-set the filter to match the Plan Definition.



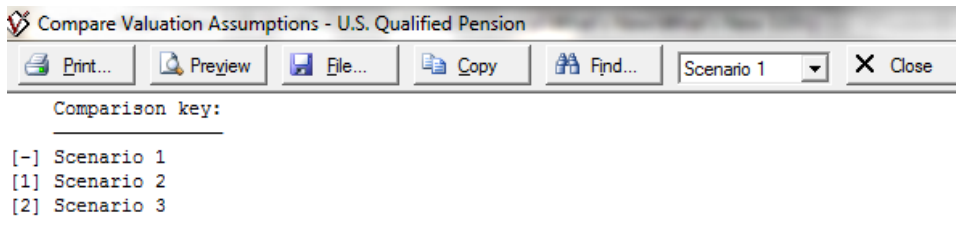
- ◆ **Deep copy.** The Copy button has a new "Deep Copy" option that lets you copy an entry along with selected references. For example, you can create a duplicate Plan Definition with references to Components A and B changed to duplicate Components C and D. For more, see [Deep Copy](#) on page 24.



- ◆ **Indirect references.** For plan building blocks such as Benefit Formula Components, Benefit Definitions, and Benefit Promises (German mode), the “Ref’d By” button can now display indirect references from higher level objects. For example, you can find the plan definitions where component X is used.



- ◆ **Compare for multiple objects.** The Compare button can now compare up to 10 objects at once. For large clients with dozens of plans and runs, this can help you review your own work (or someone else’s), e.g., to make sure the same change was made to each object.



- ◆ **More room when you want it.** To see longer names, especially in the Execute commands:
 - The “Valuation Date” column heading in Valuations and Cores has been shortened to “Val Date” and moved to the right of the “Name” column.
 - The Shortcuts Pane can be minimized to make room for long names in the Entries Pane.



Census Data

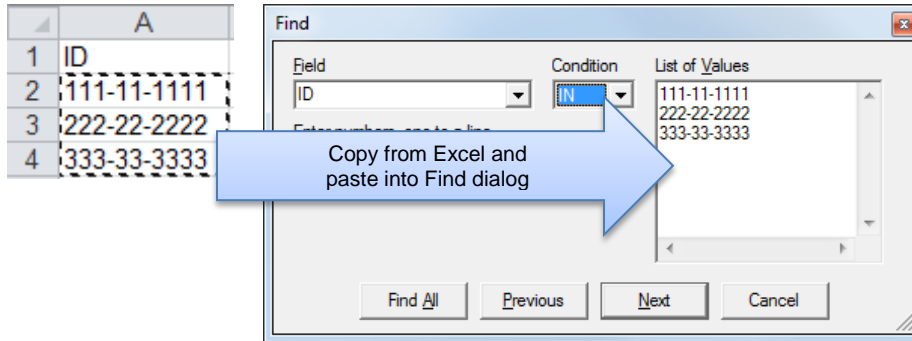
- ◆ **Compare for databases.** A new Compare button for databases lets you easily view changes made between one version of a database and another – just by selecting the key field(s). For more, see [Compare for Databases](#) on page 25.

Name	Records	Fields	Errors	Size	Unus
Data 2013	829	16	0	79,000	
Data 2013 (original)	845	13	0	64,768	

- ◆ **Highlighting for unsaved changes.** Unsaved changes in spreadsheet edit are now highlighted in light blue – making it easy to see if you accidentally changed the wrong field before saving changes.

DOB	DOH	Salary
8/04/1983	8/15/2004	36,435.03
1/01/1970	5/24/2005	34,852.67
3/03/1969	9/23/1993	36,000.00

- ◆ **Selecting a list of records.** The Find dialog now accepts a list of values (each on a new line) when you use the "IN" condition. This makes it easy, for example, to copy a list of SSNs from Excel and view those records in Spreadsheet Edit.



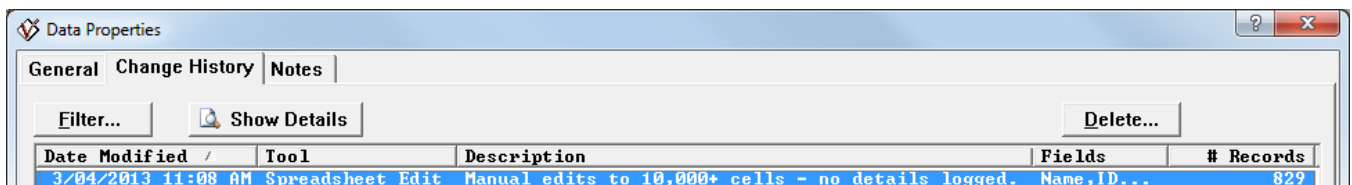
- ◆ **Smarter change history.**

- The change history now ignores spreadsheet edits that don't change values. For example, a copy and paste to the same cell will no longer be flagged as a change that needs to be saved and logged.
- To prevent the change history from growing so large that the database becomes unusable, the change history will not contain the previous and new value for manual changes when saving over 10,000 changes at once – typically the result of pasting in data.

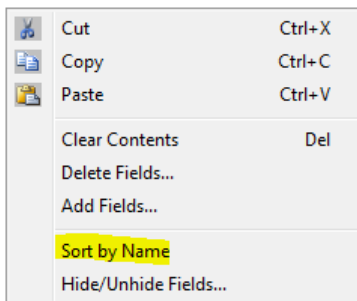
Change history will not log individual changes (the previous and new value for each cell) because there are over 10,000 unsaved cells.

⚠ 10,300 unsaved cells; change history will not log individual changes

The changes will still be logged, just without the previous and new values by record. To see these, we suggest backing up the original imported data and then using the new Compare button for databases.



- ◆ In Spreadsheet Edit (and throughout ProVal), sorts on character fields are now case-insensitive.



Pension Plans

- Calendar-year COLAs can be entered directly as constants (0.02, 0.025, etc.) instead of requiring a table for each year.

From	To	Rates
-	2012	0.02
2013	2013	0.025
2014	2014	0.03
2015		0.035
	-	

Rates:
 Constant
 Table

- Table components have new age lookup options including age nearest birthday (the only choice before), age last birthday, age in years and months, or (decrement) year minus year of birth.

Look up table values using projected age & service, except

Freeze age & service for pure unit credit
 No exceptions

Youngest/Oldest Recognized Ages

Use the age 55 table value for all ages up to age 55
 Use the age 65 table value for all ages after age 65

Table values based on

Age nearest birthday
 Age last birthday
 Age in years and months (interpolated)
 Year minus year of birth

OK Cancel

- Lump sum factor components can now utilize age by year of birth mortality.

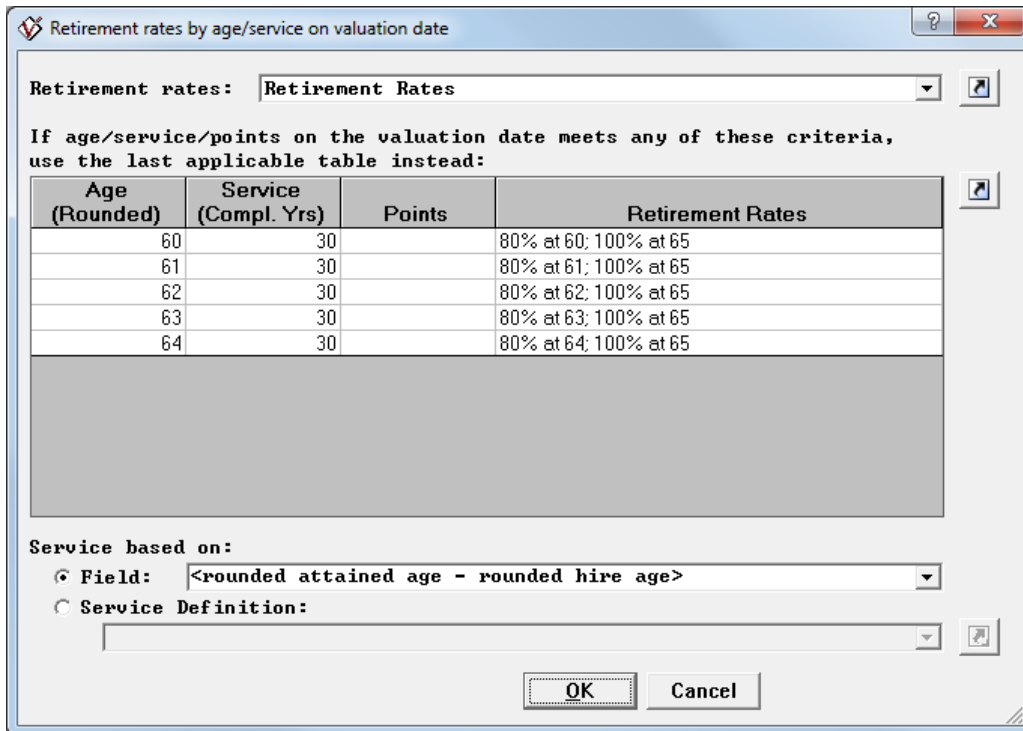
All Plans

- Retirement rates can be specified based on age/service at the valuation date.

Active Decrements

Retirement Rates: <rates by age/service on valuation date> Params...

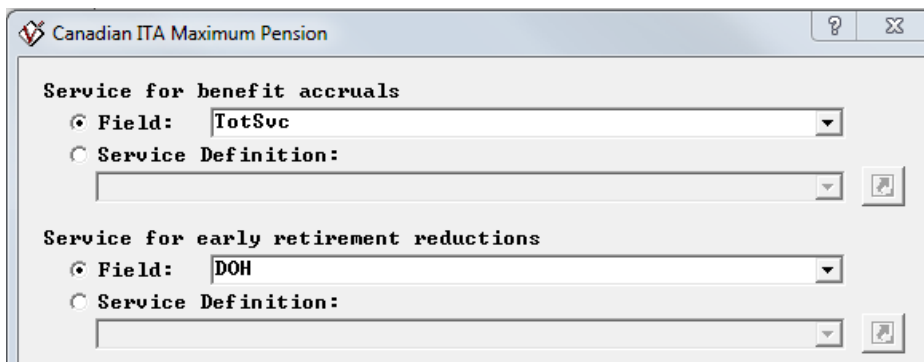
The example below gives participants past age 60 with 30 years of service a retirement rate of 80% on the valuation date and 100% at age 65. Note that in a core projection, the table applicable to a participant at each valuation date may change, creating an assumption change from one valuation date to the next.



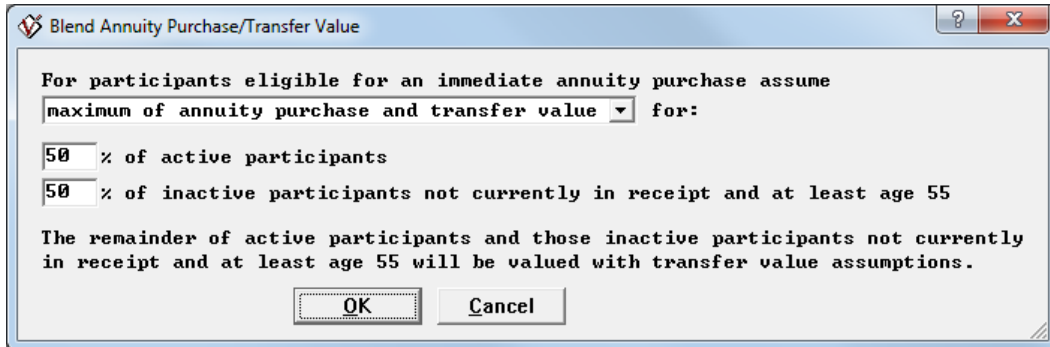
- ◆ Asset smoothing methods that calculate an asset gain can exclude expenses from the calculation. This is useful where the asset return is set net of expenses.
- ◆ The Effective Interest Rate (EIR) and average payment timing output variables have been given more precision (i.e., calculated to more decimal places). This will allow discounted benefit payments (e.g., in a spreadsheet) to more precisely match the liability. For EIR, most plans will not see a change when rounded to 4 decimals (in a survey of 4,587 PPA valuations, 85% were unchanged, 15% were changed by 0.0001, and 0.04% changed by 0.0002). The new precision will apply for valuations and core projections executed under ProVal 3.05 or later, and to valuation sets and forecasts if any underlying runs (valuations or core projections) were executed under ProVal 3.05 or later.

Canadian Registered Pension Plans

- ◆ In Valuation Assumptions > Regulatory Data, the ITA Maximum Pension calculation now allows separate service definitions to be entered for early retirement factors and benefit accruals. For example, an executive plan with benefits based on executive plan service, but early retirement eligibility (and the early retirement reduction) based on combined service under the executive plan plus the regular employee plan. While the correct liabilities could previously be achieved by adjusting the benefit formula, this explicit method allows Gain / Loss Analysis to correctly determine the gain/loss due to ITA increases.



- ◆ In Valuation Assumptions > Annuity Purchase Liability, a new option determines the solvency liability as the greater of the annuity purchase and transfer value liabilities on an individual by individual basis for participants that are retirement eligible. This is useful for Federal plans.



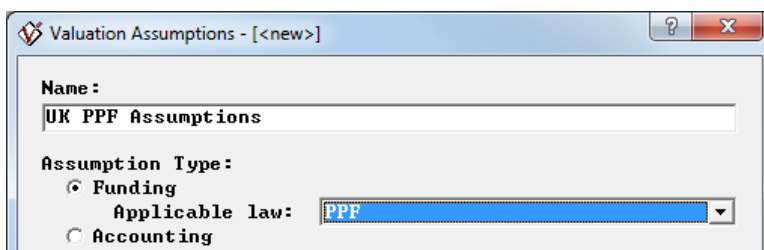
- ◆ New options exist in the Asset & Funding Policy > Minimum Funding Amortization Bases topic:
 - You can exclude Solvency special payments from the calculation of the minimum required contribution
 - You can specify separate amortization periods for ongoing losses, ongoing plan amendments, and solvency special payments.

OPEB Plans

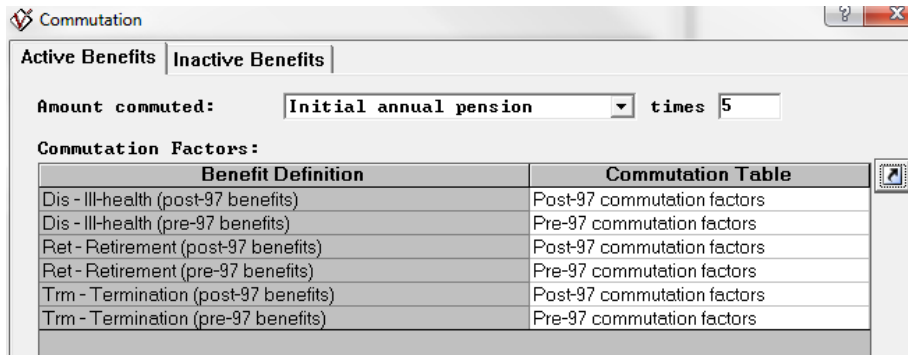
- ◆ Expected benefit payments are available by year in individual results. For example, you could save the next 10 years of expected benefit payments by individual.
- ◆ A warning will display if it appears that #DEC operators are being used to manage benefit eligibility (e.g., "Claims * [#DECYEAR >= 2020]") and middle of year decrements are assumed. This is to prevent against inadvertently distorting the averaging of present values by averaging 0 with another number.

UK Pension Plans

- ◆ ProVal now supports the Section 179 Pension Protection Fund Liability. To calculate, define Valuation Assumptions with "Funding" Assumption type and "PPF" Applicable law. For more details, please see the Technical Reference article called "U.K. Pension Protection Fund Liability (Section 179)" in Help.



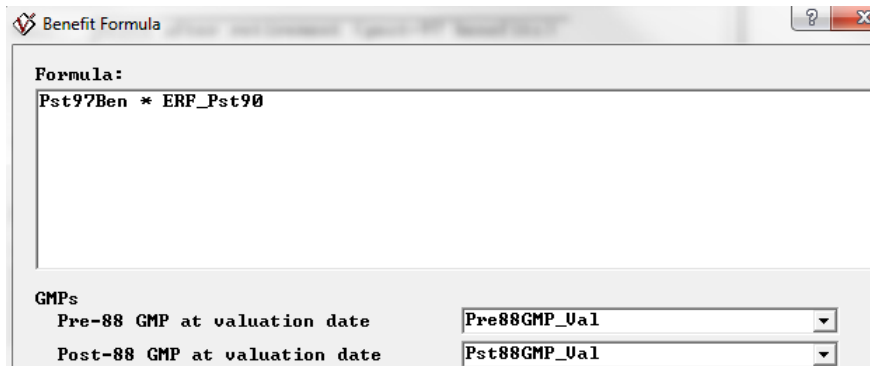
- ◆ In Valuation Assumptions, commutation factors now vary by benefit (e.g., to reflect different pension increases for different tranches of benefit).



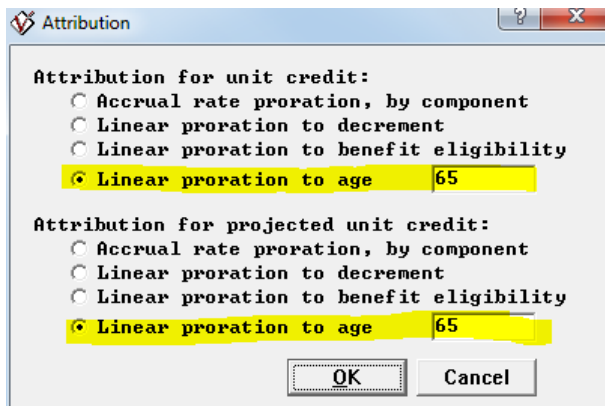
- ◆ In Valuation Assumptions, there are new options for the nominal GMP and excess revaluations if commencement age precedes GMP age.



- ◆ GMPs are now specified separately for each benefit. Thus, if a scheme has multiple pre-1997 tranches, you can allocate the GMPs to them however you see fit by setting up different GMP amounts in the data.



- ◆ Benefit Definitions contain a new PUC and UC attribution option: linear to a specified age. This proration method is appropriate for use with benefits that project service to a fixed age such as death in service and ill health benefits. It uses proration fractions of (service @ valuation date) / (service @ proration age) at beginning of year and (service @ valuation date + 1 year) / (service @ proration age) at end of year. Exception: decrements in the valuation year have an end of year proration fraction of 1 so that their normal cost recognizes the full benefit.



- ◆ Cash flows (projected benefit payments) split by GMPs, commuted amounts, lump sums, and pension increases are now available through the View button in an executed Valuation (not the Output).

Cash flows subject to the following increases:
 (Basis: Accounting EBO)

Year	Total	No Increases	Pre-88 GMP Increases	Post-88 GMP Increases	Active Members		Deferreds		Retirees	
					Non- Annuity	Excess Annuity	Non- Annuity	Excess Annuity	Non- Annuity	Excess Annuity
2011	587,629	0	21,950	49,498	217,261	22,751	0	195	0	275,975
2012	558,937	0	28,847	67,669	142,619	37,642	0	8,512	0	273,649
2013	585,874	0	30,837	74,415	122,882	60,417	0	24,063	0	273,259
2014	604,578	0	34,427	85,136	107,360	77,174	0	29,671	0	270,810
2015	618,755	0	36,114	91,587	89,953	96,676	0	35,161	0	269,265

- ◆ Post-decrement death benefit calculations now switch from in-deferment to post-commencement interest and mortality at the earlier of member commencement age and member death. Previously, the switch occurred at spouse commencement age.

German Pension Plans

- ◆ Valuation Dates are now expected to be entered as of the end of the reporting period (e.g., 31 Dec instead of 1 Jan). Regulatory data and other year-indexed parameters from one day after the valuation date will apply in the first year of decrement (e.g., for a 31 Dec 2012 valuation date, the 2013 regulatory data will apply in the first year of decrement).
- ◆ The algorithm for age and service calculations has changed in accordance with German practice. Service calculations count the first and last day of the period (e.g., the period from 18 Jan to 17 Feb represents 1 month). Ages round up if the last birthday is more than 6 months before the valuation date and round down if 6 months or less before the valuation date.
- ◆ To assist in valuing Contribution Related Defined Benefit Plans:
 - Cash Balance and Career Average components honor allocation dates and can roll forward accrued benefits from the preceding valuation date.

- Lump Sum Payment Forms have an option to split the lump sum into several annual installments, to which COLAs can apply. (This was inspired by German pension plans, but available in all pension modes.)

Payment Form Definition - [Annual Installment]

Name: Annual Installment

Type: Lump Sum, No Life Contingencies

Benefit paid:

- immediately
- at (member) age
- at (member) age specified by a database field
- after number of years
- after number of years specified by table

Table service based on:

- Field: <rounded attained age - rounded hire age>
- Service Definition:

Divide into 3 equal annual installments, or fewer if amount would fall below 1,000

- ◆ Deferred Compensation Promises are now supported – both Ongoing and Optional.

Benefit Promise - [<new>]

Name:

Promise type: Pension

Benefit Definition:

- Pension
- Jubilee
- Deferred Compensation Ongoing
- Deferred Compensation Optional

- ◆ For speed, cash flows will not be calculated unless selected by the user in the Census Data button of Valuations.
- ◆ Benefit Definitions have a new option to adjust for state pension contributions. The necessary tax rates are entered in Valuation Assumptions > Regulatory Data.

PSVaG, State Contributions & Attribution

Include this benefit in PSVaG Liability

Adjust this benefit for state pension contributions

- ◆ A new Map button on the Plan Definition screen simplifies the mapping of data codes to Promises (instead of a Selection Expression for each Benefit Promise such as "BenProm = 1", "BenProm = 2", etc.) and makes it easy to see/review the mapping all in one place.


Map database codes to Benefit Promises

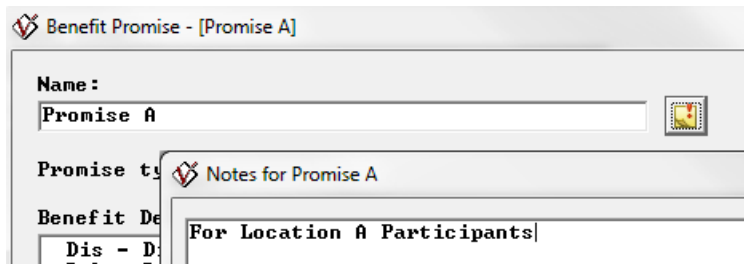
Value Benefit Promises only for mapped database codes

Coded database field: BenProm

Select a Benefit Promise for each code:

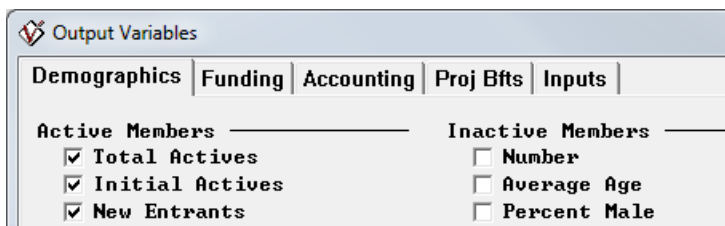
Database Code	Benefit Promise	Notes
Promise A	Promise A	For Location A Participants
Promise B	Promise B	For Location B Participants
Promise C	Promise C	For Location C Participants
Promise D	Promise D	For Location D Participants
Promise E	Promise E	For Location E Participants

- ◆ Notes can be entered for benefit promises by clicking the Notes button . An “!” indicates that Notes have, in fact, been entered.



Forecasting

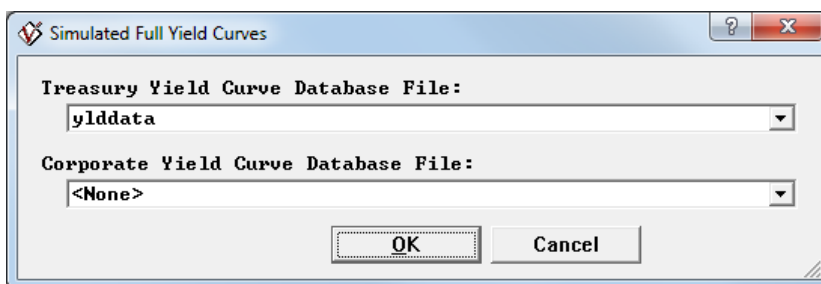
- ◆ In core projections, new output variables split the total number of active participants into the number of initial actives and cumulative number of new entrants still in active service at each year.



- ◆ In Projection Assumptions > Valuation Sensitivities, lump sum interest rates can have a non-zero sensitivity to interest rate changes when forecasting to a full yield curve. This applies for both lump sum factor components and optional payment form conversions.
- ◆ Nine new variables are available as custom stochastic variables and for Stochastic Trial Detail for the 3 segment rates under Funding, Max Tax, and PBGC in PPA forecasts (U.S. Qualified mode).
- ◆ For Trial Details saved from a Stochastic Forecast the top of the file includes additional summary information about the portfolios and variables written to the file.

Capital Market Simulations

- ◆ Full corporate and treasury yield curves can be imported into ProVal databases and used in Custom capital market simulations. These curves can also be exported to ProVal databases from an Explicit Corporate Yield Curve simulation.



A Yield Curve database has a record for a given year/trial and a field for each duration. You must use the field names “yFcstYear”, “yTrial”, “yDur01”, “yDur02”, ..., “yDur30”. A Record Layout named “Import simulated full yield curves” has been added to the library to assist with importing yields.

RecID	yFcstYear	yTrial	yDur01	yDur02	yDur03	yDur04	yDur05
1	1	1	0.0781242	0.0788119	0.0791036	0.0791977	0.0791890
2	1	2	0.0409977	0.0449472	0.0481271	0.0507833	0.0530517
3	1	3	0.0142207	0.0199417	0.0247252	0.0288362	0.0324270
4	1	4	0.0582970	0.0610549	0.0631599	0.0648444	0.0662325
5	1	5	0.0405153	0.0446404	0.0479678	0.0507474	0.0531188
6	1	6	0.0613705	0.0637523	0.0655306	0.0669312	0.0680724
7	1	7	0.0734305	0.0747111	0.0755169	0.0760571	0.0764356

- ◆ The View of capital market simulations and efficient frontiers now parse nicely into cells when saving/copying into Excel.

Government Forms

- ◆ The Schedule SB, MB and PBGC extracts have been updated for Relius 2013 Edition.
- ◆ ProVal now calculates a Weighted Average Retirement Age. While primarily designed for inclusion on IRS Form 5500 Schedule SB, it is available from many places (and in all modes):
 - A sample life report in funding valuations shows the calculation details for each active participant.
 - An output variable for Valuations, Valuation Sets, Core Projections, and Deterministic Forecasts shows the value across all participants.
 - An exhibit in Valuation Set Exhibits and U.S. Government Forms Extract shows the average rate and weight at each age.

(1) Age	(2) Expected Active Headcount	(3) Retirement Rate	(4) Expected Retirements (2) * (3)	(5) Weighted Age (1) * (4)
55	485.25	0.0509	24.70	1,358.24
56	470.60	0.0486	22.86	1,279.90
57	454.70	0.0484	22.01	1,254.51
58	435.55	0.0489	21.30	1,235.35
59	426.04	0.0491	20.92	1,234.30

Gain/Loss Analysis

- ◆ Continuing active gain/loss can be run on user selected database fields including:
 - Service fields and part-time percentages.
 - Cash balance or career average account balances.
 - Coded fields such as job class, group, etc. which may impact assumptions or benefit provisions.

The difference between using expected and actual end of period data will be measured. In many cases, this can bring the unreconciled gain/loss for continuing actives down to zero, saving a lot of time when analyzing results.

This feature can also be used in lieu of Data Corrections for changes in fields such as date of birth, date of hire, sex, etc. Note however, that the results will not be identical since data corrections measure the difference between using original vs. corrected beginning of period data rather than expected vs. actual end of period data.

Report Writer

- ◆ Valuation date, measurement date, plan year, fiscal year, and projection year tags can now be included in your report for all modes. Previously, they were only available in U.S. Qualified mode.

Administration Factors

- ◆ Year of birth mortality tables can now be used to produce Administration Factors. The valuation year parameter will be used as the year of reference. Thus, if the valuation year is 2010, the age 65 factor would be for someone born in 1945, the age 64 factor for someone born in 1946, etc.

Nondiscrimination Testing

- ◆ The number of sample lives for nondiscrimination testing can now be capped to 20 or fewer records, like for other sample lives.

Processing Speed

- ◆ Multi-core processing and the Grid Platform have been improved in several ways.
 - All of the extra Windows memory previously needed to distribute processing has been eliminated.
 - Most of the internal file I/O previously used to manage distributed jobs has been replaced with inter-process shared memory. This reduces the overhead and will marginally speed up processing.
- ◆ Valuations and core projections have been sped up significantly in several ways.
 - Pre-processing phase (at 0% complete): Determining which benefits to value for each participant is now much faster. In one valuation with 250,000+ records and hundreds of benefit groups, pre-processing decreased from 22 minutes to about 3.
 - Processing phase (from 0% to 100% complete): Runs with active "post-decrement death" benefits where the beneficiary is determined at member death (or earlier of member death and member commencement) are much faster and require less memory.
 - Post-processing phase (at 100% complete): Runs with individual results are now much faster. In one valuation with 250,000+ records, saving individual results decreased from 36 minutes to about 5. Also, the progress message is updated periodically, e.g., "Saving individual results (50,000 of 200,000 records)", so the run doesn't appear stalled at 100%.

System

- ◆ Excel Macro-Enabled Workbooks (with .xlsm extension) can be used for importing census data and saving output.

Save as type:

- ◆ The List Objects command (under the File Menu) now parses the Last Modified column separately when the output is saved to Excel, allowing the output to be sorted.
- ◆ For new installations, the "name=" parameter in proval.ini is now left blank so that the username (login ID) will appear in headers and footers, be identified as who's using a client, etc. On dialogs with a dropdown field as the first field, the initial focus is on the OK button (or equivalent default button) to help prevent inadvertent changes that occur when bumping the mouse wheel.
- ◆ For easier viewing, messages are now centered on the parent form, not the center of the screen.

- ◆ A new ProAdmin license type has been added. Users of a ProVal License Server may now see ProAdmin licenses listed separately. Previously, ProAdmin users were able to use ProVal's Full and Partial licenses to access ProAdmin.

Batch Server

- ◆ The batch server is now tolerant of briefly losing a network connection. It will retry a few times before aborting the job.

Changes Log

- ◆ Be sure to read the changes log (see the "changes log.doc" file in the ProVal directory) about updates to certain calculations that may change results.



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GASB Statements No. 67 and 68

ProVal 3.05 supports GASB's updated pension accounting and financial reporting standards, Nos. 67 and 68. Prior to version 3.05, although you were able to run accounting liabilities in ProVal's U.S. Public Pension mode, GASB 25 and 27 accounting results were based on funding liabilities. Now, GASB 67 and 68 require that accounting liabilities are valued distinctly from funding. Below is a summary of the enhancements in ProVal as well as a discussion of how to use ProVal's results to calculate the discount rate.

Enhancements to Valuation Assumptions, Valuation Results, and Core Projection Results

The Accounting Valuation Assumptions > Liability Methods topic has a new checkbox: "Calculate Entry Age Normal." If checked, the Entry Age Normal liability will be calculated using the following parameters as prescribed by GASB:

- Basis: Level % of salary
- Funding span: From first funding age to last age before 100% retirement
- Employee contribution methodology: Expected contributions for the year

There are options on the screen for calculating present value of future salary and valuation salary, consistent with funding assumptions.

The screenshot shows the "Liability Methods" dialog box with the following settings:

- Calculate Entry Age Normal
- Calculate Vested ABO liability (PBO & ABO always run)
Include benefits based on eligibility at: valuation date
- Maximum Compensation Limit for PUPS & valuation salary: <none>
- Timing for PUPS, valn. salary & number: Middle of year
- Adjust to middle or end of year with:
 - interest discount
 - survivorship discount
 - salary increase
- Timing assumed for Employee Contributions: Middle of year
- PBO benefits never less than ABO benefits
- PBO equal to ABO for cash balance and career average components
- PBO & ABO Attribution Service - Linear Proration to Decrement
 - Field: <date of hire>
 - Service Definition:

The Entry Age Normal Accounting Liability, accounting present value of future salaries, and the average expected service lives are available from valuation and core projection output, and there is a new scaling factor for the Entry Age Normal Accounting Liability.

Enhancements to Asset & Funding Policy and Valuation Sets

The Initial Asset Values topic has inputs for the measurement date, market value of assets, and contribution receivable. ProVal accepts measurement dates up to one year after the valuation date and rolls forward liabilities from the valuation date to the measurement date. Although GASB allows liabilities to be rolled forward up to 30 months and 1 day, roll-forwards of more than one year will not be permitted in ProVal.

The 'Initial Asset Values' dialog box contains the following fields:

- Funding Assets:**
 - Valuation Date: [text box]
 - Market Value (inc. receivable): [text box]
- Accounting Assets:**
 - Measurement Date: [text box]
 - Market Value: [text box]
 - Contribution Receivable: [text box]

Buttons: OK, Cancel

The GASB Accounting topic lets you select GASB 67/68 and specify the inputs necessary to develop the pension expense and statement of net pension liability.

The 'GASB Accounting' dialog box contains the following fields and controls:

- Expense calculations under:** [dropdown menu: GASB 67/68]
- Expected Return on Assets:** [text box]
- Net Pension Liability:** [text box]
- Additional current year expense:** [text box]
- Deferred Outflows & Inflows (including current year asset gain/loss)**
 - Schedule date: [text box]
- Table:**

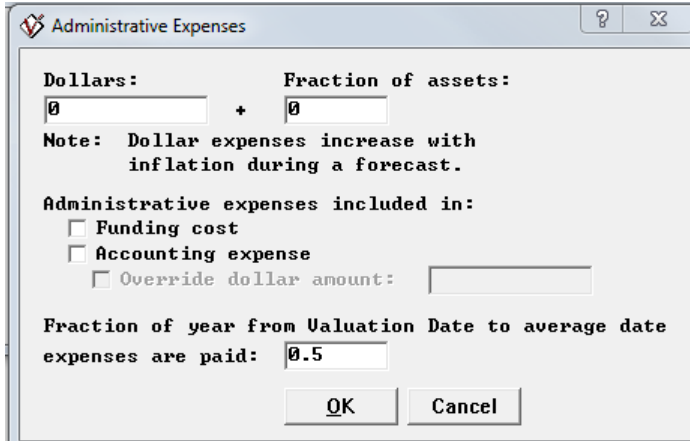
Description	Remaining Period	Deferred Outflow/ (Inflow)
[empty table area]		
- Net deferred outflows:** 0
- Recognize new net deferred outflows using a % increase rate

Buttons: OK, Cancel, New...

The schedule of deferred outflows & inflows should include the current year difference between expected and actual earnings (asset gain/loss). ProVal backs into the current year difference between expected and actual experience (liability gain/loss) using the funded status, the net pension liability, and the sum of outstanding deferred outflows and inflows (including current year asset gain/loss).

New liability gains and losses and assumptions changes will be recognized over the average expected service lives. The numerator is the active total expected future service. The denominator is the active headcount expected to receive benefits plus the inactive headcount. If rounding is selected, this value will be rounded to 4 decimal places. Asset gains and losses calculated by ProVal will be recognized over five years and plan changes will be recognized in the year they occur. There is also an option to recognize new net deferred outflows using an increase rate.

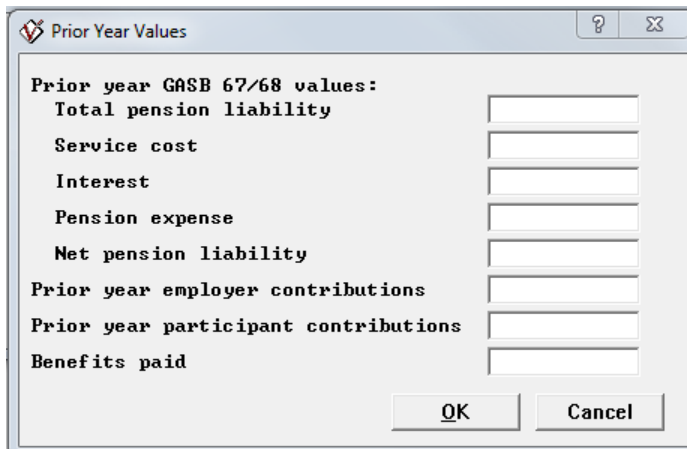
The Administrative Expenses topic has an option to allow expenses to be included in accounting expense, consistent with other modes in ProVal.



The Administrative Expenses dialog box contains the following fields and options:

- Dollars:** Input field with value 0.
- Fraction of assets:** Input field with value 0.
- Note:** Dollar expenses increase with inflation during a forecast.
- Administrative expenses included in:**
 - Funding cost
 - Accounting expense
 - Override dollar amount: [Input field]
- Fraction of year from Valuation Date to average date expenses are paid:** Input field with value 0.5.
- Buttons:** OK, Cancel.

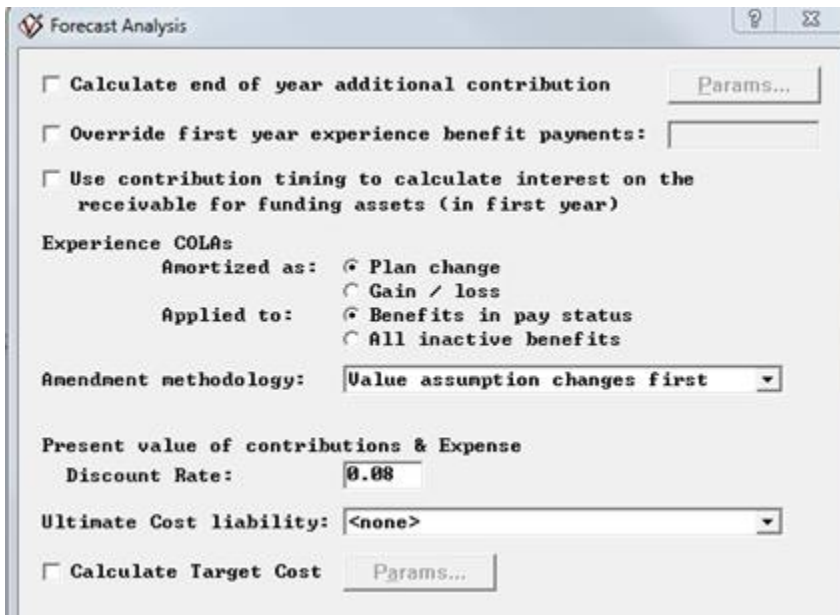
A new Prior Year Values screen accepts inputs used to reconcile the net and total pension liabilities.



The Prior Year Values dialog box contains the following fields:

- Prior year GASB 67/68 values:**
 - Total pension liability [Input field]
 - Service cost [Input field]
 - Interest [Input field]
 - Pension expense [Input field]
 - Net pension liability [Input field]
- Prior year employer contributions [Input field]
- Prior year participant contributions [Input field]
- Benefits paid [Input field]
- Buttons:** OK, Cancel.

On the Forecast Analysis topic, Entry Age Normal Accounting Liability has been added as a liability type option for the end of year additional contribution, the Ultimate Cost Liability, and the Target Cost calculations. The checkbox to "use contribution timing to calculate interest on the receivable for funding assets (in first year)" has been added to the dialog, consistent with other ProVal modes.



The Forecast Analysis dialog box contains the following fields and options:

- Calculate end of year additional contribution [Params...]
- Override first year experience benefit payments: [Input field]
- Use contribution timing to calculate interest on the receivable for funding assets (in first year)
- Experience COLAs:**
 - Amortized as: Plan change, Gain / loss
 - Applied to: Benefits in pay status, All inactive benefits
- Amendment methodology:** Value assumption changes first [Dropdown]
- Present value of contributions & Expense:**
 - Discount Rate: 0.08 [Input field]
- Ultimate Cost liability:** <none> [Dropdown]
- Calculate Target Cost [Params...]

An additional Valuation Set event has been added called "Accounting Methodology Change." It will capture a change in the expected return on assets.

The Valuation Set View and Output include GASB 67/68 output variables of relevant parameters. There are three new Valuation Set Exhibits:

- Development of Pension Expense
- Reconciliation of Net Pension Liability
- Deferred Outflows & Inflows of Resources

Enhancements to Deterministic & Stochastic Assumptions and Forecasts

Deterministic Assumptions allow funding and accounting investment returns to be input separately, consistent with other ProVal modes. Additionally, the accounting expected return on assets can vary in a forecast.

Stochastic Assumptions allow the accounting discount rate and accounting expected return on assets to vary in a stochastic forecast. Additionally, the Entry Age Normal Accounting liability has been added as a liability target option in an excess return efficient frontier.

Forecast View and Output include new GASB 67/68 output variables of relevant parameters and there are four new Deterministic Forecast and Stochastic Trial Exhibits:

- Development of Market Assets (Acctg)
- Development of Pension Expense,
- Reconciliation of Net Pension Liability
- Development of Deferred Outflows & Inflows of Resources

Additional Notes

- Separate valuation assumptions can be set up to calculate the net pension liability using a discount rate of +/- 1%.
- Entry Age Normal Accounting liability can be selected as a liability type in a gain/loss analysis.
- GASB 67 and 68 prohibit using the "Entry Age Normal with replacement" method. A warning will be produced if an alternative Entry Age Normal normal cost formula is detected.
- Participants in a DROP should be valued as inactive (with zero service cost).

Discount rate

ProVal will not determine the discount rate directly, but you can derive the rate using ProVal output. Below are two possible approaches to developing Table 1 in Illustration 1 of GASB No. 68.

Year	Projected Covered-Employee Payroll			Projected Contributions			
	Payroll for Current Employees (a)	Payroll for Future Employees (b)	Total Employee Payroll* (c) = (a) + (b)	Contributions from Current Employees (d) = (a) × 5%	Employer Contributions for Current Employees (e) = (a) × 10%	Contributions Related to Payroll of Future Employees [†] (f) = (b) × 3% [‡]	Total Contributions (g) = (d) + (e) + (f)
1	\$ 488,072	\$ -	\$ 488,072	\$ 24,404	\$ 48,807	\$ -	\$ 73,211
2	474,494	34,321	508,815	23,725	47,449	1,030	72,204
3	469,203	61,237	530,440	23,460	46,920	1,837	72,217
4	463,875	89,109	552,984	23,194	46,388	2,673	72,255

The example in Illustration 1 of GASB No. 68 uses a simple approach for determining projected salary, fiduciary net position, and cash flows in future years which depends only on the results from a valuation. This is described in the first approach below. The second approach is more complex and requires core projections. The Actuary should use professional judgment to determine whether either one of these or an alternative methodology is appropriate.

1. Valuation approach

- Run a valuation and output the following items:
 - a. Total Salary
 - b. Normal cost by decrement (to isolate the employee contribution piece)
 - c. Projected benefits by year
 - d. Projected active salary by year
- Fill in the columns of Table 1 above as follows:
 - a. "Payroll for Current Employees:" Enter the projected active salary by year from ProVal
 - b. "Payroll for future employees": column (c) less column (a)
 - c. "Total employee payroll:" Enter the total salary from ProVal in row 1 and the assumed total payroll in future years
 - d. "Contributions from current employees:" Employee contribution rate times column (a), where Employee contribution rate equals the employee contribution portion of the normal cost output from ProVal divided by the first year salary
 - e. "Employer contributions for current employees:" Employer contribution rate times column (a), where Employer contribution rate is either defined by statute or otherwise estimated as described in paragraph 28 of GASB No. 68.
 - f. "Contributions related to payroll of future employees:" Employee contribution rate; plus Employer contribution rate; less normal cost rate; times column (b); where Normal cost rate is the gross normal cost (with employee contributions added back in to the net) divided by the first year salary
 - g. "Total contributions:" Calculate as column (d) + (e) + (f)

2. Core Projection approach

- Run a closed group core projection for up to 99 years on the baseline sensitivity (Run I)
 - a. Output the expected benefit payments, normal cost by decrement, and total salary
- Run an open group core projection for up to 99 years on the baseline sensitivity (Run II)
 - a. Output the expected benefit payments, normal cost by decrement, and total salary
- Fill in the columns of Table 1 above as follows:
 - a. "Payroll for current employees:" Enter the total salary by year from Run I above
 - b. "Payroll for future employees:" column (c) less column (a)
 - c. "Total employee payroll": Enter the total salary by year from Run II above
 - d. "Contributions from current employees:" Enter the employee contribution portion of normal cost from Run I above
 - e. "Employer contributions for current employees:" Employer contribution rate times column (a); where Employer contribution rate is either defined by statute or otherwise estimated as described in paragraph 28 of GASB No. 68.
 - f. "Contributions related to payroll of future employees:" employee contributions from Run II minus employee contributions from Run I; plus employer contribution rate times column (b); less normal cost from Run II minus normal cost from Run I.
 - g. "Total contributions:" column (d) + (e) + (f)

Once the total contributions have been determined through the Valuation Approach or Core Projection Approach, Tables 2 and 3 from Illustration 1 of GASB 68 can be filled in to determine the Discount Rate.

Table 2: Projection of the Pension Plan's Fiduciary Net Position

Year	Projected Beginning Fiduciary Net Position (a)	Projected Total Contributions* (b)	Projected Benefit Payments† (c)	Projected Administrative Expense‡ (d)	Projected Investment Earnings§ (e)	Projected Ending Fiduciary Net Position (f) = (a) + (b) – (c) – (d) + (e)
1	\$ 1,431,956	\$ 73,211	\$ 109,951	\$ 1,000	\$ 105,981	\$ 1,500,197
2	1,500,197	72,204	116,500	1,030	110,815	1,565,686
3	1,565,686	72,217	123,749	1,061	115,454	1,628,547

Fill in the columns of Table 2 above as follows:

- “Projected Beginning Fiduciary Net position:” Enter the current fiduciary net position in row 1, then set rows 2, 3, etc. equal to column (f) from rows 1, 2, etc.
- “Projected total contributions:” Enter the values from column (g) of Table 1
- “Projected benefit payments:” Enter the projected benefit payments by year (either from a Valuation or closed group Core Projection)
- “Projected administrative expenses:” Enter the current year administrative expenses in row 1, then increase with the assumed increase rate to obtain rows 2, 3, etc.
- “Projected Investment Earnings:” investment return on columns (a) through (d)
- “Projected Ending Fiduciary Net Position:” (a) + (b) – (c) – (d) + (e)

Table 3: Actuarial Present Values of Projected Benefit Payments

Year (a)	Projected Beginning Fiduciary Net Position* (b)	Projected Benefit Payments† (c)	Projected Benefit Payments		Actuarial Present Values of Projected Benefit Payments		
			“Funded” Portion of Benefit Payments (d)	“Unfunded” Portion of Benefit Payments (e)	Present Value of “Funded” Benefit Payments (f) = (d) + (1 + 7.5%) ^(a)	Present Value of “Unfunded” Benefit Payments (g) = (e) + (1 + 4%) ^(a)	Present Value of Benefit Payments Using the Single Discount Rate‡ (h) = (c) + (1 + 5.29%) ^(a)
1	\$ 1,431,956	\$ 109,951	\$ 109,951	\$ -	\$ 102,280	\$ -	\$ 104,427
2	1,500,197	116,500	116,500	-	100,811	-	105,088
3	1,565,686	123,749	123,749	-	99,613	-	106,019
4	1,628,547	131,690	131,690	-	98,610	-	107,154

Fill in the columns of Table 3 above as follows:

- “Year:” Enter the values 1 to n
- “Projected Beginning Fiduciary Net position:” Enter the values from column (a) of Table 2
- “Projected benefit payments:” Enter the values from column (c) of Table 2
- “Funded Portion of Benefit Payments:” column (c) when (c) >= (b), else 0
- “Unfunded portion of benefit payments:” column (c) when (c) < (b), else 0
- “Present value of funded benefit payments:” column (d) discounted with the long term investment rate of return (as described in Paragraph 26a)
- “Present value of unfunded benefit payments:” column (e) discounted with the assumed yield on high quality corporate bonds (as described in Paragraph 26b)
- “Present value of benefit payments using the single discount rate:” column (c) discounted with a single discount rate; iteratively solve for the single discount rate so the sum of column (h) equals the sum of columns (f) and (g).

Mortality Enhancements

ProVal 3.05 contains enhancements to the Mortality Rates Library, including:

- the ability to create a “linked” table that draws its base rates from another table or tables, with multiplicative or age setback adjustments
- a new library devoted to mortality improvement scales
- the ability to apply different improvement scales pre- and post-commencement, optionally with different base years applied
- the use of so-called “two-dimensional” mortality improvement scales, in which the rate of mortality improvement (or decline) depends not only on the age corresponding to the relevant mortality rate, but also on the years over which the improvement occurs

Linked Tables

When creating a new mortality table, a new option links the base rates to another table (or distinct tables pre- and post-commencement), and optionally applies multiplicative or setback adjustments.

The screenshot shows a dialog box titled "Mortality Rate Table - [<new>]". It has a "Name:" field at the top. Below it is a section labeled "Age Values:" containing a table with two columns: "Age" and "Unisex". The "Age" column lists values from 15 to 25. At the bottom of the dialog, there is a checked checkbox labeled "Link mortality base rates" and a "Params..." button.

Age	Unisex
15	
16	
17	
18	
19	
20	
21	
22	
23	
24	
25	

In the case below, a linked table will be generated with no pre-commencement mortality and post-commencement mortality of 90% of the male rates in the 1983 Group Annuity Mortality table, setback 6 years for females.

The screenshot shows a dialog box titled "Mortality Table Base Rate Linkage Parameters". It is divided into two sections: "Pre-commencement base rates drawn from:" and "Post-commencement base rates drawn from:". Each section has a "Mortality table:" dropdown, radio buttons for "All rates", "Male rates only", and "Female rates only", and input fields for "Scaling factor:" and "Age setback:" for both Male and Female.

Pre-commencement base rates drawn from:

Mortality table: <no rates>
 All rates Male rates only Female rates only

Scaling factor: Male: 1 Female: 1
Age setback: Male: 0 Female: 0

Post-commencement base rates drawn from:

Mortality table: 1983 Group Annuity Mortality Table
 All rates Male rates only Female rates only

Scaling factor: Male: 0.9 Female: 0.9
Age setback: Male: 0 Female: 6

Buttons: OK, Cancel

Upon clicking OK, the base rates will appear but will not be manually editable. This allows you to create variations of standard tables in an easy, documented way that requires no manual entry and can be reviewed with ease and confidence. However, if any changes are made to the source tables, those changes will automatically modify this linked table and, if appropriate, erase any dependent valuation/core projection results.

Mortality Rate Table - [<new>]

Name:

Male Age by Pre/Post-commencement Values:

Age	Pre-Commencement	Post-Commencement
15	0	0.000293
16	0	0.000300
17	0	0.000309
18	0	0.000318
19	0	0.000329

Improvement Scales Library

Previously in ProVal, any mortality improvement scales used for a mortality table would be included within the mortality table itself, whether a standard scale or a user-defined custom scale.

Now, ProVal contains a fully independent Mortality Improvement Scales Library, where scales are separately stored and can be viewed or imported/exported independently of the mortality tables in which they are used:

Shortcuts

- Census Data
 - Databases (14)
 - Data Dictionary (122)
- Valuations
 - Census Specifications (3)
 - Plan Definitions (3)
 - Valuation Assumptions (7)
 - Mortality Rates (24)
 - Disability Rates (0)
 - Termination Rates (2)
 - Retirement Rates (6)
 - Salary Merit Scales (1)
 - Mortality Improvement Scales (5)**
 - Post Decrement Probabilities (0)

Mortality Improvement Scales Library

Name	Modified
Scale BB	9/14/2012 1:02 PM
Scale BB2D (RPEC Q&A A3)	9/14/2012 1:02 PM
Scale AA	1/01/2000 12:00 AM
Scale H	1/01/1983 12:00 AM
Scale D	1/01/1971 12:00 AM

Separate Pre- and Post-Commencement Improvement

While Pre/Post-Commencement mortality tables have always permitted custom improvement scales in ProVal, ProVal 3.05 includes the ability to fully separate these scales if desired, and apply separate base years to these scales if appropriate.

Apply Improvement Scale

Pre-Commencement: Base year:

Post-Commencement:

Projection: Fully generational To year

Two-dimensional Mortality Improvement

Background

In September 2012, the SOA Retirement Plans Experience Committee (RPEC) released the *Mortality Improvement Scale BB Report*, as well as a supporting Q&A based on the previously released Exposure Draft. Available on the Society of Actuaries [website](#), the report contains a discussion of Scale AA, which was released over a decade ago and does not appear to be tracking well with recent mortality improvement experience, and its eventual successor.

As part of their analysis, RPEC referenced recent work by the Continuous Mortality Investigation (CMI) group of the Institute and Faculty of Actuaries in the U.K., modeling mortality improvement as a two-dimensional array that varies by both age and calendar year. In modeling the divergence between recent experience and the mortality improvement implied by Scale AA, RPEC also released the interim Scale BB without a calendar year dimension, for use with existing valuation systems, as a precursor to the official replacement for Scale AA, expected in late 2013 or early 2014. However, they noted that the official replacement would almost certainly include a dimension related to the calendar year of mortality improvement.

In *Questions and Answers Regarding Mortality Improvement Scale BB*, RPEC published the two-dimensional rates underlying the development of interim Scale BB.

Implementation

In addition to Scale BB, ProVal 3.05 includes its two-dimensional source (called "BB2D"), as well as full functionality for custom two-dimensional mortality improvement scales. When working within this library, clicking Options lets you define an improvement scale to be of either the Attained Age type or the Age by Year of Improvement type.

Mortality Improvement Scales - [Scale BB2D (RPEC Q&A A3)]

Name: Scale BB2D (RPEC Q&A A3)

Male Age by Year of Improvement Values: Rates for: Males

Age	<=1950	1951	1952	1953	1954	1955	1956	1957
<= 19	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000
20	0.0246	0.0136	0.0075	0.0060	0.0067	0.0093	0.0135	0.0186
21	0.0363	0.0168	0.0051	0.0014	0.0045	0.0089	0.0132	0.0174
22	0.0565	0.0308	0.0103	-0.0007	-0.0020	0.0047	0.0114	0.0163
23	0.0641	0.0475	0.0240	0.0061	-0.0026	-0.0019	0.0062	0.0131
24	0.0590	0.0495	0.0350	0.0171	0.0043	-0.0013	0.0006	0.0080
25	0.0546	0.0441	0.0332	0.0220	0.0112	0.0041	0.0016	0.0038
26	0.0595	0.0444	0.0303	0.0194	0.0119	0.0075	0.0052	0.0047
27	0.0614	0.0510	0.0347	0.0208	0.0115	0.0071	0.0067	0.0068
28	0.0551	0.0499	0.0397	0.0262	0.0152	0.0086	0.0064	0.0076

Improvement Scale rates are: Annual reductions Cumulative factors

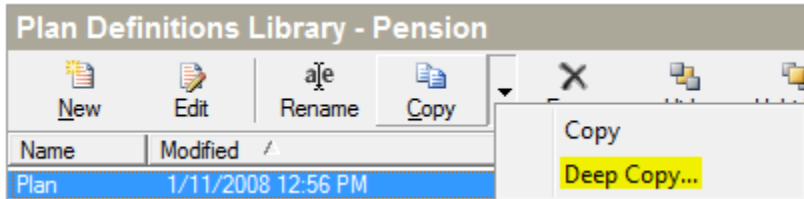
Table Type: Age Table
Row & Column Limits...: Age by Year of Improvement Table

Buttons: OK, Cancel

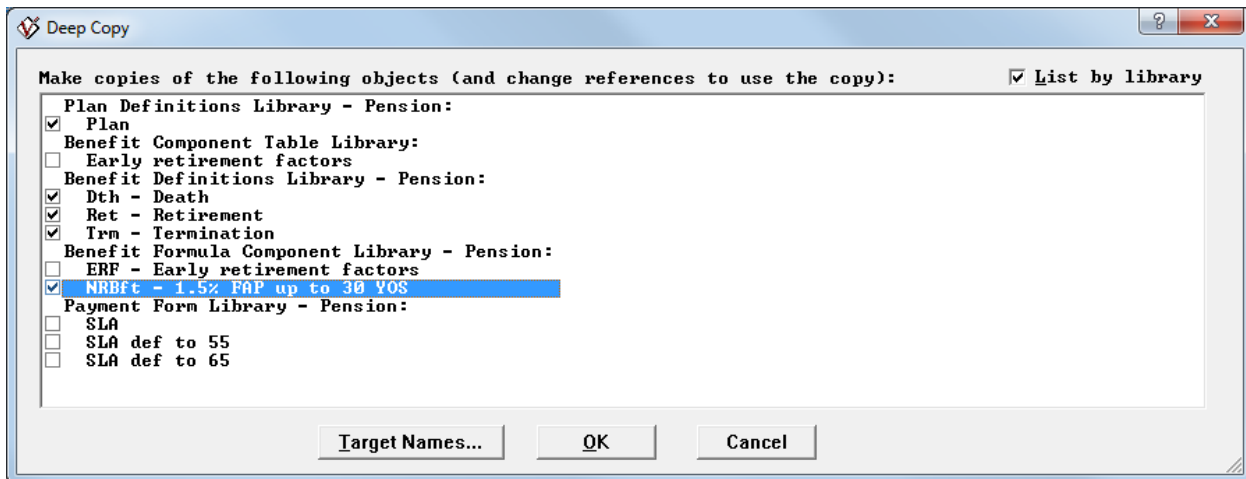
Furthermore, when applying two-dimensional scales, ProVal supports the use of either annual reductions, as published by RPEC, or cumulative multiplicative factors, as preferred in the U.K. by the Institute and Faculty of Actuaries. For more information, see the ProVal Help articles for "Mortality Improvement Scales" in the Command Reference and "Mortality Improvement (Generational Mortality)" in the Technical Reference.

Deep Copy

When revising a Plan Definition (e.g., for a plan change), it is often desirable to leave the old Plan Definition intact. This facilitates comparisons (old plan vs. new plan), gain/loss analysis, etc. However, the task can quickly become tedious since you must create a set of duplicate Benefit Formula Components, Benefit Definitions with updated Benefit Formulas, and Plan Definition referencing the new Benefit Definitions. One way to avoid much of the tedium is to make a copy of the Client, make the changes, and then import them back into your original client. Now, Deep Copy lets you do this completely within the original Client.



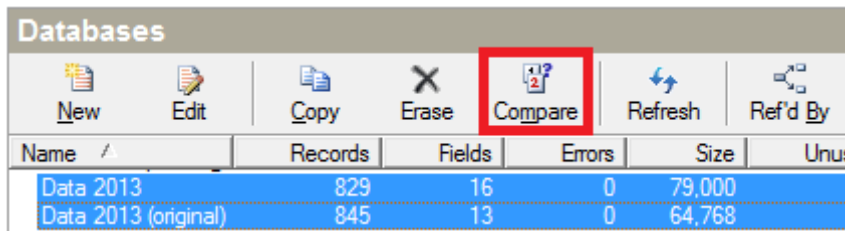
Deep Copy lets you make a copy of an object (e.g., Plan Definition) and selected objects it references (e.g., Benefit Formula Components), automatically updating references to refer to the new copies. You can even provide Target Names for the new objects instead of using ProVal's default "#2" suffix.



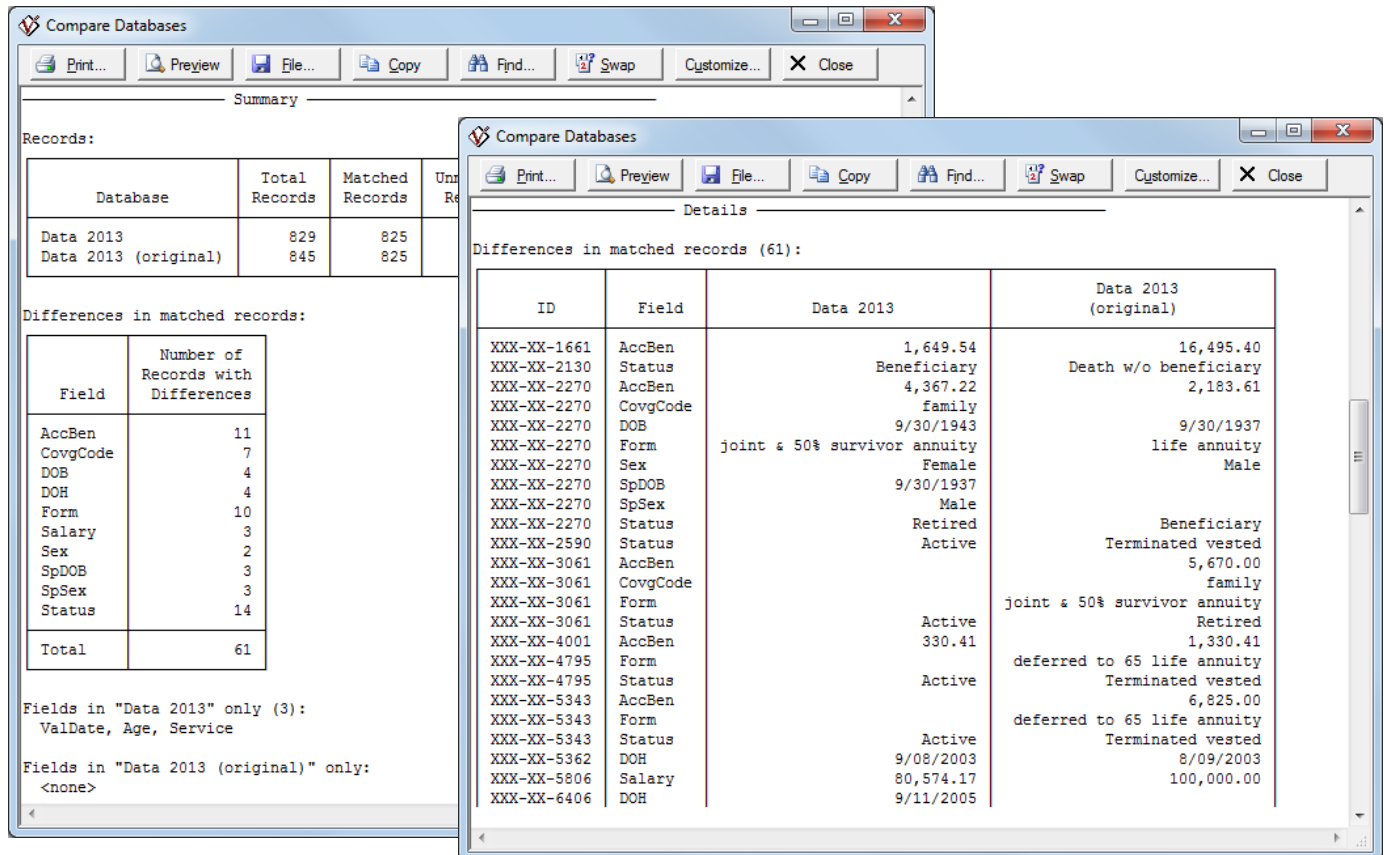
The easiest way to use Deep Copy is probably to select the lowest level objects that you want to revise (e.g., Benefit Formula Components) and let ProVal check and uncheck related objects to keep your selections logically consistent. For example, checking the "NRBft" component above causes the Benefit Definitions "Dth ...", "Ret...", and "Trm..." to be checked, as well as the Plan Definition.

Deep Copy is available in all ProVal libraries that refer to other libraries, not just Plan Definitions. Thus, you can make a Deep Copy of any high level object such as a Valuation or Deterministic Forecast.

Compare for Databases



A new Compare button for databases lets you easily view changes made between one version of a database and another.



This has some very useful applications:

- **Reviewing data changes.** While a database's change history is an important tool for reviewing data changes, it doesn't provide the new and old data values for every change. If you make a copy of your database after importing, a simple Compare between the original and current database will reveal the old and new values, plus added and deleted records.
- **Finding records affected by a change.** If you make a change in assumptions or plan provisions that only affect a few participants, a compare of two individual results databases (before and after the change) will reveal the records that were affected.
- **Quickly comparing year-over-year data.** A comparison between the current and prior year's valuation data can reveal unexpected changes (e.g., changes in dates of birth) or changes you might not otherwise look for (e.g., a change in someone's name) before you engage in more rigorous data screening. While not a substitute for data screening, this comparison is an easy initial check on small- or medium-sized databases to see if the data import looks reasonable.

The report can be tailored to your needs by clicking [Customize](#) to select fewer fields or omit record-by-record details.