**RISKGPS USER’S GUIDE**

RiskGPS is an efficient, cost effective, and informative Interest Rate Risk analysis tool for less complicated community banks. It was built to provide bankers with an analysis of the impact that changing interest rates could have on the bank’s financial performance and the potential for loss. *The analysis uses regulatory methodologies to arrive at reasonable approximations of the impact of changing rates on a static balance sheet.* A Performance Forecast was added to provide a more meaningful report of the potential changes to the bottom-line, four quarters from the current quarter. *The RiskGPS report, in conjunction with bank policy, measures, monitors, and allows actions to be taken to control the bank’s financial exposure.*

*RiskGPS asks – and answers – the two questions that are imperative in measuring and managing your bank’s interest rate risk on an ongoing basis:*

1. *How will the Net Interest Margin from the bank’s current balance sheet change in the next year if interest rates are unchanged and how would this estimate be affected by different rate conditions?*
2. *What would happen to the market values of the bank’s assets and liabilities and, by subtraction, the market value of the bank’s equity, at varying interest rates?*

The first question addresses the traditional definition of “interest rate risk”, applying differing relative rate sensitivities to the maturity schedule of each balance sheet category and subjecting the whole to changing rates through an immediate and contract “shock”, most used in regulatory reporting.

The second recognizes that changing interest rates affect equity and liability, the bank’s two sources of strength and viability, as well as short-term income. RiskGPS incorporates the most modern techniques to evaluate the resilience of the bank’s structure and reports its Economic Value of Equity (EVE) risk estimate in clear, transparent terms. This includes an evaluation of the before-and-after capacity of the bank in comparison to policy limits set by the Board of Directors.

Plansmith professionals can help you develop trends in these two key areas, and because we have experience working with many institutions, we make available a broad range of alternatives and solutions to help you guide your bank to a successful future.

**Data Source**

The system utilizes data from Call Reports filed by your bank with the government each quarter. Although the data is less detailed than could be obtained from other sources (i.e., your bank’s accounting system), it is still useful in analyzing your bank’s interest rate risk. The program modifies and adjusts call report information to prepare it for the analysis. For most small to medium-sized, less complicated community banks, there is enough information contained in Call Report data to generate reasonable answers to those two key questions.

As a bank’s balance sheet or product mix becomes more complex, a more sophisticated program that allows for more granularity in the data will become a necessity and the banker will be encouraged to upgrade to a more robust ALM system like Plansmith’s Financial Compass©.

**About the Analysis**

*The interest rate risk measurement methods recommended and/or required by bank examiners mandate two views of the bank’s position: the short-term income impact, and the long-term perspective as seen in the potential change to the bank’s Economic Value of Equity (EVE).* At its heart, RiskGPS provides results to meet these criteria. It is not the position of this program to recommend either but, rather, to do the math, report the results and meet regulatory guidelines for acceptability.

*The short-term risk to Net Interest Income (NII) is analyzed using two methods, Rate Sensitivity Gap and simulation of net interest income over nine rate scenarios (up and down 400bp and the current (zero) point).* The efficiency of these methods has been practiced and accepted by banks and examiners alike for many years.

*The long-term risk is measured in terms of the potential change in the bank’s EVE, also referred to as Market Value of Equity (MVE).* This value is the market value. *This method calculates the mark-to-market value of each side of the balance sheet, and by subtraction, determines the market value of the bank should it be sold off in pieces.* It is important to note that *this does not yield a traditional or even accurate measure of the bank’s value, as it would be seen in a sale or merger context.* See additional content in this User’s Guide for more detail on how we calculate market and market values.

**About the Report**

The actual RiskGPS report has been designed to appear as a book, with narratives, tabular results, and charts. This allows for greater clarity and demonstrates cause-and-effect relationships. It has a beginning (historical trend views), a middle (the actual risk on the current balance sheet), and an end (the Performance Forecast). This is done to make it more comfortable to read, less daunting than a sheaf of paper covered with numerical tables, and to help the non-accountant/analyst or Board Member understand the potential gains and losses in the bank’s position as rates change.

There is a one-page Executive Summary that provides a quick review of all the analysis results. At the top of this page, you will see the bank’s current position and performance results. The next section shows the bank’s risk position with respect to the rate change that will cause declining income or equity loss; in other words; the “high-risk” rate environment for the bank. Lastly, the bottom section of the Summary shows a projection of the bank’s performance over the next four quarters based on prior quarter’s trends and current assumptions.

Immediately following the Executive Summary, several pages present historical data, balance sheets, income statements, and yield & cost reports, all to help the reader put the bank’s progress into perspective, as well as to provide a quick “data consistency” review. In reviewing these pages, you can quickly see changes that may suggest trends and any data issues that should be resolved before accepting the results.

The main body of the report - the actual analysis - is the keystone of the entire risk analysis system. It is where the work is done and the analysis for each method is presented concisely, yet in adequate detail. The program attempts to establish a benchmark against which the results of the analyses can be compared, prepares the data for analysis, and finally, shows the analysis itself.

The subsequent pages of the report are a recap of the assumptions you input into the Assumption pages and then used in the calculations, as well as estimates that show the defaults versus any user inputs or changes to the defaults. This helps the reader better understand the components of the results.

The power of the system lies in its ease of use and is based on the assumptions that generate the analysis. The following sections of this User’s Guide explain the methods used to generate the initial or default assumptions by the system and an explanation of the use of these assumptions in the report. The user is strongly urged to review these default assumptions and adjust to align with the banker’s experience and market conditions. *Make sure you document any changes in Assumption for your ALCO/Board Meetings and Examiners.*

RiskGPS is meant to be a reasonable approximation of a bank’s risk position, produced with minimal effort and expense, and highly effective for most less-complicated community bank.

GETTING STARTED

**How to Log In**

To log in, enter your Driver’s ID and Password then click the ‘Risk’ button.

We recommend that the user ALWAYS review the report data first, as it is directly fed from the Call Report, to ensure accuracy of the information uploaded for use in the program. There are reports within RiskGPS that will assist in this review and facilitate the user’s auditing of the Call Report Transmission file.

**RiskGPS® Interest Rate Risk, Report Calculation Methodology**

Risk is a broad concept as it covers so many aspects of the bank. While the Comptroller of the Currency has defined nine risks, we will focus only on one in our analysis, Interest Rate Risk. All banks have risk, but some could absorb the consequences and go on, whereas others may not. If we are going to measure risk, we need a benchmark against which to measure the potential severity of the loss. Our starting point is to prepare the analysis and give it meaning by calculating Risk Tolerance, the ability to endure losses and continue to maintain an adequate capital ratio. There are two risk tolerances, Capital and Interest Margin. While both relate to the capital ratio, one is a simple subtraction while the other involves the expense levels and the impact of changing rates on the bank’s Net Interest Income.

**MARGIN RISK TOLERANCE**

*Risk Tolerance is the ability to absorb losses to capital while still maintaining a ratio above the minimum level. This is calculated by subtracting the minimum capital ratio from the bank’s current capital ratio.* Your bank’s Tier 1 Equity Risk Tolerance ratio can be found in the introductory paragraph on the Margin Risk Tolerance page in RiskGPS. This will also serve as a benchmark to measure severity as we determine the impact of changing rates on the bank’s Equity Ratio. *When we use the term Net Interest Income (NII) we are referring to the actual dollar value, whereas Net Interest Margin (NIM) is the ratio of NII to Average Earning Assets.*

**Risk Tolerance**

*Risk Tolerance is the ability to absorb a decline in NII yet continue to maintain a NII above the minimum requirement. The minimum NII is the NII that must be generated to maintain the current capital level, pay dividends, and cover all operating expenses including loan losses. If the bank generates at least this amount then all is well and its current Capital Ratio will be maintained; however, if the actual NII falls below the minimum, the Capital Ratio will also fall below the current minimum level.* Note: Non-Interest Income is presented as a contra expense on the Risk Tolerance Analysis.

**Tax Equivalent Adjustment**

Since the NIM is usually stated as a tax equivalent ratio, the system adds tax-free income to the calculation. The default is calculated using the most recent quarter, annualized. There is no manual adjustment for this value.

Income is grossed up to pre-tax and then the taxes are calculated. It is important to remember we are dealing with minimum levels of income and expense. That is why the taxes are not necessarily the taxes we would pay if we were trying to calculate the expected earnings. Note: if the bank is a **Sub-chapter “S”** and has selected that in the assumptions area, there may still be a small tax rate calculated for state tax purposes. *Choosing the Sub-S option in the Assumptions sets the effective rate to zero.*

Total Other Expenses totals all overhead values. On the Risk Tolerance Report, the Minimum Required Interest Margin (MRE +Total Other Expenses) is the NII that the bank must generate to cover all expenses and maintain its capital ratio at or above a minimum level. Net Interest Income Risk Tolerance, the bank’s ability to absorb losses in the NII and continue to meet total expense, is calculated by subtracting the Minimum Interest Margin from the Interest Margin at the Zero Rate Simulation value. This then becomes the benchmark against which Net Interest Margin will be measured.

**Rate Sensitivity Gap Report**

**Gap analysis** has been a staple in risk measurement since the late 1970s when it was introduced as a simple technique to determine the impact of rising and falling rates. While its true effectiveness continues to be questioned, it is, nonetheless, still used in a very large number of financial institutions and by many examiners. The report has two roles within the RiskGPS analysis: it is a standard technique and, since it presents the current cash flow, maturity, and repricing information, it forms the basis for the simulations and market value calculations in later reports.

The top of the **Gap Report** shows the Securities and Loan maturity information contained in the call report, unadjusted. The body of the report shows the adjusted values based on data refined through the assumptions. We advise you to review this report and be satisfied that the results shown are consistent with the bank’s views. At the bottom of the Gap report, you will find the **incremental gap** (i.e., rate sensitive assets – rate sensitive liabilities) for each period. The program calculates the Cumulative Gap as well as the **Gap Ratio RSA/RSL**. This can be used in conjunction with the bank’s rate risk policy.

Another calculation is the **Time-Weighted 12-Month Gap**. This helps correlate the twelve-month mismatch, a one-year rate change, and the potential risk in Net Interest Margin (NIM). The simple **Cumulative Gap** equally weights all Gap positions throughout the year. In actuality, the short-term Gap will have a greater impact than the long-term Gap because its effect will be felt longer. By time-weighting the incremental Gaps, we can produce a more accurate measurement of the impact of rate changes on the one-year NIM. *The formula is: NIM change=Time-Weighted 12-month Gap/Total Earning Assets. This simple technique shows the impact on NIM for a 100bp change in rate. The impact will depend on the sign of the Gap as well as the sign of the rate change.*

For example, if the 12-month Time-Weighted Gap is 50,000 and the Total Earning Assets are 200,000, then the expected impact on NIM would be -25bp for a -100bp change in rates. This would be true for an immediate and sustained -100bp change. Note: In this analysis, the significant period is a twelve-month horizon. However, the report displays the full-time horizon and totals because the data can be used as an audit tool, as well as used in the calculation of market values, later in the report.

**Assumptions Impacting Gap**

The default assumptions in the program are calculated from historical relationships and/or industry standards when there is a lack of information. RiskGPS allows the banker to refine and change these assumptions to build a more realistic analysis.

1. **Beta Assumptions**

Impact on the distribution of non-maturing balances in the Gap report. The program performs a historical analysis of the relationship between the change in rate on the account and interest rate changes as seen in the movement of the six-month T-Bill rate. These analyses are separated into rising and falling rate environments. *The user can develop an even more accurate relationship for the analysis by answering the question:* “*How would the bank change its offering rate if rates were to rise or fall 100bp over the next twelve months?”.*

Research indicates that when assigning **Betas for CDs**, the banker should set the rate based on a percentage (Beta) of Fed Funds. The initial assumption is set to the research (default) value of 71%, indicating that the new rate on CDs will change 71% of the rate change level in both the Simulation of NIM and the calculation of EVE at each level. You may change this percentage in the Deposit Assumptions for both regular and jumbo CDs.

**Net Interest Margin (NIM) Simulation Calculations**

Simulation of the new interest margin under varying interest rate conditions is becoming the method of choice by regulators as it incorporates optionality in the analysis. Note: NIM simulation is executed without balance sheet growth or mix-change effect.

**Prepayment Assumptions**

Plansmith Defaults for Prepayment Assumptions are estimates based on Plansmith’s analysis of recent industry client data. The user should review these assumptions and make changes appropriate to their bank’s risk profile and market conditions. It is also highly recommended that the user run alternative prepayment scenarios to analyze the impact on results due to assumption changes.

***Prepayment speeds are applied to all loans, MBS, and CMOs****.* Callable bond data described earlier is also applied in the simulation for each rate level. As rates rise, bond calls will mostly likely decline; they will likely increase as rates fall. Both situations – prepayments and callability – will result in a non-linear profile between interest income and Net Interest Margin as market rates change.

**Application of Rate Changes**

*The maturing balance categories (Loans, Securities, CDs, and Maturities, including prepayments) are subtracted from the current balance at the old rate and replaced at the new rate based on the rate change scenario. In the case of CDs, the new rates used are 71% of the shock rate. This is the result of research carried out on the average Beta for renewing CDs.* The new volume and rate are blended into the remaining balances to calculate the interest on the category. The RiskGPS system uses the old portfolio yield as the roll-off rate on the maturities. Note: the program uses the Tax Equivalent Yield on Securities to calculate interest income.

*Non-Maturing categories such as MMDA and Savings do not have maturities, and the entire portfolio is re-priced at the new rate. However, the new category rate is calculated using its Beta factor.* For example, if the Beta on the account is 25%, then the rate change for that category is the old rate plus the change in the market rate level, multiplied by 25%. The new rate is used to calculate interest on that category.

*The result of these calculations for each category is summarized in the program report.* The chart at the bottom of the report displays the Net Interest Margin. The formula is (Interest Income-Interest Expense)/Total Earning Assets. *The Minimum Required NIM is also shown on the chart as a benchmark against which to measure severity of the risk. The difference between the Simulated NIM and the Minimum is the Risk Tolerance. If the NIM is above the Minimum, the bank will continue to protect its capital ratio. When the NIM falls below the Minimum, it indicates that the capital ratio could fall.*

**Back-Testing of Net Interest Margin (NIM)**

RiskGPS provides an automated back-testing analysis to measure the reasonability of the projected change to net interest margin as anticipated by the Rate Shock Projected Margin, as compared to the actual change in net interest margin of the same period. It does so by using the historical data as well as the historical projected rates for those periods.

This service can be performed by Plansmith’s Advisory Services team or an outside third party; however, this is not usually required with models that are Call Report driven, as the assumptions are not as complex.

*Using identical calculations, a margin is determined for historical periods (up to 4 years back) using the projected rate forecast for those periods. The projected change in Net Interest Margin is compared to the actual change in Net Interest Margin and a variance/error is then determined. The absolute value of variances is averaged to create the Average Error over the past 4 years and is reported on the bottom of page 15a, expressed as +/- basis points.*

Although a lower number is always desirable, the Average Error may be large, i.e., greater than 10% of the total margin, for a variety of reasons. For example, as the period comparisons are relatively long it would be common for management to intervene and alter the intended outcome as compared to the original assumptions used to develop the analysis. Another consideration is the predictive rates used in the margin calculation as compared to the actual rates recorded. Rates can be key indicators of changes amplified in the balance sheet as the bank changes its tactics accordingly.

**Rate Shocked Economic Value of Equity (EVE) Calculations**

*Rate Shocked EVE is a calculation of the market value of each category in the balance sheet. The system uses the Discounted Cash Flow (DCF) method in some cases and the Duration method in others. In all cases, the optionality within the category is applied at each rate shock level. Rate Shock of Market Value is always immediate and sustained and rate changes are applied, assuming a parallel shift in the yield curve.* Note: *There is sometimes a great deal of confusion surrounding the term ‘market value’. In this analysis, we are calculating the market value of each balance sheet category using a permutation of discounted cash flow.* It is not unusual for a banker to believe that the value of deposits should increase as rates increase but this is just a perspective. From the depositor’s perspective, these are less valuable as rates increase. The discounted cash flow method is neutral, i.e., it just discounts the net present value of future cash flows. *In the MVE calculations, the objective is to determine the net equity position of the bank by calculating the market value of the assets, less the market value of the liabilities. From the banker’s perspective, the objective is to have the deposit values fall faster than the asset values, thus increasing the difference, or “EVE”, at the assumed liquidation.*

**Calculation of Loan Market Value**

RiskGPS uses the Discounted Cash Flow (DCF) method to calculate the market value of loans and applies prepayments at each shock level. The discount rate is taken as the average rate on new loans made during the quarter, as an indication of a market rate. However, the user is encouraged to review this rate and determine a proper discount rate. Note: *When determining the market rate in the NPV calculation, like a bond, the lower the rate the higher the value of the instrument. Likewise, the higher the market rate used, the lower the value of the portfolio. The market rate is “shocked” at each shock level in the analysis to determine the risk due to rate change.* *Although non-accruals are included in the loan balances, these balances are not rate shocked and maintain a constant value.*

**Calculation of Securities Market Value**

*The calculation of the market value of securities is performed using* ***Duration****.* *The duration of an instrument is the expected percent change in its market value for a 100bp change in rate.* *Duration is easily converted into years and thus, percentages, by dividing the monthly durations by twelve.* Therefore, a 24-month duration is equivalent to two years, which translates to a 2% change in market value for each 100bp change in rate. If your bond report states duration in years, the duration must first be converted to months and then divided by twelve to compare with that used in RiskGPS.

The duration at each shock level is determined considering prepayments on the MBS and CMO duration, as well as the callable model on the Agency securities. These values are used as defaults. Users are strongly advised to review the bond portfolio analysis obtained from a respected bond analysis program and use the market values to override the defaults in the Securities Assumptions. Durations will adjust after saving your entries. Note: the objective is to have the same market values on the program report as are displayed in the bond analytics output from an outside bond analysis program.

**Calculation of Non-Maturing Deposit Market Value**

***Decay rates*** *are a method for creating artificial maturities for non-maturing deposit accounts so Discounted Cash Flow calculations can be applied.* It should be noted that *the duration of a non-maturing account is about half of the decay rate. The longer the decay rate, the longer the duration, and therefore, the more sensitive the market value of these deposits will be*.

*The program estimates decay rates using* ***Beta Factors****. The idea is that the lower the Beta, the less rate sensitive the category, and, therefore, the longer the decay rate. The estimated decay rates are calculated in the Deposit Assumption section. The formula for these assumptions is 12/Beta (%).* For example, a 25% Beta translates to a 48-month decay rate, or 24-month duration. You are strongly advised to review these decay rates and the resulting market values of these non-maturing categories, and to adjust where appropriate.

**Calculation of All Other Liabilities Market Value**

CDs and Borrowings are calculated using discounted cash flow, using their current yield as the discount rate and shocking at each level. The CD market rate is computed to be 71% of the shock rate, which is reflected in the Beta factors for a renewing CD. Note: The market value of Fed Funds Sold and Purchased are taken at book in all cases.

**Risk Calculation**

In the report, the percentage change in the bank’s EVE, or mark-to-market market value, is shown at each interest rate shock level. While we are unaware of any written regulatory policy on the level of change in value of this number, our experience in working with examiners and banks completing exams is that the change to equity should not exceed -10 for each 100bp of shock. This may vary with the examining agency or even the examiner, and as each bank is unique, must be evaluated individually while still adhering to specific policy limits adopted by your Board of Directors.

**Strategy Bubbles - Risk Management Strategy Calculations**

The Rate Risk Management Strategy analysis is not a required risk analysis but is unique to Plansmith products and helps clarify the relationship between the components of risk. There are two parts to the report: the top chart plots the earning assets and paying liabilities as a whole, and the bottom chart breaks out the product types within each. In both, the constant maturity (CMT) yield curve is provided as a reference point. In between is a table showing the key elements in numeric format, Yield and Duration. The Duration difference is sometimes called the Duration GAP, i.e., the difference between the duration of assets and liabilities.

*Bubbles allow you to quickly inspect and compare the difference between the asset yield and the yield curve for the same duration Treasury bond, as well as the average cost rate on liabilities to the same curve. These differences are called benefits because the bank is getting a yield higher than the same term Treasury security or paying a cost rate below the same term Treasury security. The vertical distance in the yield curve, at asset and liability durations, is called the mismatch risk and is the amount of NIM gain due to taking duration risk (i.e., separating the bubbles).*

*If these bubbles overlap, the bank would have no risk. Its assets and liabilities would alter their yields, as well as their respective market values, roughly in tandem as rates change. However, as the two bubbles move apart, risk is created: the farther apart, the greater the risk (and, in normal times, the greater the reward). For example, as the asset bubble moves to the right, it usually moves asset yield up, parallel with the yield curve. The steeper the yield curve slope becomes, the greater the increase in NIM. It is also increasing the Duration Gap with greater risk to asset market values, and so, EVE, when rates change.*

The user can think of rate risk management as moving these two bubbles left or right, or closer or farther apart. To help determine which components of the balance sheet could be adjusted, the bottom chart allows bubbles for the individual components. Moving these bubbles will impact the larger bubbles and show the resulting risk.

**PERFORMANCE FORECAST**

With all this rate risk analysis accomplished, bankers will want to know what their performance will be over the next four quarters. The RiskGPS report will provide the bottom-line by combining the **Blue Chip Rates** (*a professional rate consensus forecast from 50 top economists*), along with our simulations, to determine the new interest margin over the coming four quarters – as well as the ROA and key ratios associated with that performance.

The forecast of key parts of the yield curve is shown at the top of the **Forecast Performance** page. Since each bank is slightly different in structure, we have tried to apply weighting to various parts of the balance sheet to account for the impact of a changing yield curve, though recognizing that the yield curve does not move in parallel within each period. This is a refinement to forecast that may not be required but is presented. The goal is to demonstrate, using your individual bank’s unique structure, how changing rates could affect its capacity and performance.

*By applying the weighted average rate change to our simulations, we can estimate the change in the Net Interest Margin (NIM). This new NIM is presented as a ratio to average earning assets. Profit and Loss (P&L) is stated as a percentage of average assets and so, RiskGPS must convert the NIM as a percent of earning assets to a percent of average assets to use in the P&L. This accounts for the difference in NIM on this report versus the NIM simulation on previous pages.*

The other values in the P&L are taken from the Risk Tolerance assumptions and are converted to ratios. The P&L ratios as a percentage to average assets are shown for the previous four quarters, the current quarter, and the projected four quarters, to help the user see the trends. Also included on the far right of the page are the actual dollar value projections.

**NAVIGATION**

RiskGPS is easy to navigate and web-based, making it easy to access anytime, anywhere. The home screen displays your institution’s name, the date the report was last updated, and the anniversary date of your subscription.

**RiskGPS Main Menu**

While there are 4 menu options to choose from, most of your time will be spent in the Assumptions sections as you review and adjust your data.

Menu options:

* View Report
* Assumptions
* Data Update
* Setup

1. **View Report**: Allows direct access to any page of the final report. As you modify and save your assumptions, you will be taken immediately to the report page most affected by the adjustments made.
2. **Assumptions**: There are five sub-options that allow the user to further quantify the data being used in the analysis.
3. Risk Tolerance Assumptions
4. Loan Assumptions
5. Securities Assumptions
6. Deposit Assumptions
7. Reclassifications Assumptions
8. **Data Update**: There are three sub-options in this feature:
9. **Upload TRN**: load the bank’s current quarter Call Report transmission file
10. **Rollback TRN**: allows you to go back one quarter after the current transmission file has been uploaded
11. **Reload** (uncommon): refresh your RiskGPS plan by loading an amended Call Report
12. **Setup**: Allows you to order a Model Validation report for examiners, or to add additional subject banks for analysis. There is a fee to add additional subject banks. Note: If you acquire a new institution or run analyses for multiple banks, you may add these additional Subject Banks as needed. The additional banks will appear within the "Subject Bank Selection" box. However, please be advised that you will be charged for each Subject Bank added to your account. The user is responsible for payment for all banks selected and may only be removed by a member of our staff. If you select a bank in error, please call us immediately so that we can adjust your account accordingly.

In addition to the various tabs from which to operate RiskGPS, the tool bar in the upper right-hand corner allows you to move from page to page, generate reports and export them to a PDF file, access a copy of the RiskGPS User's Guide online via the Help menu, send feedback to our staff, and log out of the system.

**Data Updates**

**When is RiskGPS updated with new data?**

*Approximately five weeks after the end of the quarter, or shortly after the required quarter filing cycle has concluded, RiskGPS automatically updates all bank records from the FDIC. Once this global update occurs, you will be unable to access previous quarterly reports.*

In the rare event that your institution submits an amended Call Report after the RiskGPS global data update, you can refresh your RiskGPS plan by using the Reload option. The system will access the FDIC website and pull your amended quarter information. You will NOT be able to reload prior quarter information when filing multiple revised Call Reports, but the revised information will be included in historical information used by the system for calculation trends and default assumptions.

**Can I update RiskGPS with new data before the global update?**

Yes, you can upload your new data into RiskGPS once you’ve filed your new quarterly call report. Using the Data Update menu option, simply select Upload TRN for the current quarter. You will be asked to browse for the location of your **Call Report Transmission file (TRN)**. Select your file and the data will upload in seconds.

You can also select Load from FDIC to retrieve your data from the FFIEC site, approximately 24 hours after filing. This will pull your data directly and populate your RiskGPS system.

In the event you have updated for the current quarter but have not saved the data from the previous quarter’s report, there is a Rollback feature. Here you can roll back to the previous quarter, print your report and save your PDF to your PC or network, then reload your current quarter data. This option only lasts for a limited time, until RiskGPS uploads the most recent quarter for all banks.

**PRINTING**

To print, follow these steps:

1. Click ‘Export to PDF’
2. Click ‘Generate Report’
3. Click ‘View PDF Report’
4. Print a copy of the report to your printer or save the file to your PC

**SAMPLE RISKGPS REPORT WITH EXPLANATIONS**

RiskGPS™ offers 4 distinctive sections of financial information and analysis: History, Calculations (Income & Rate Shock of Income and Market Value), Forecast, and Assumptions. End-of-quarter balances are used for these calculations.

1. **HISTORY**
2. Executive Summary: this is a recap for your board and/or examiners of the inherent risk position to the existing balance sheet for your institution.
3. Balance Sheet: your balance sheet data is taken directly from Schedule RC from the Call Report. These are End-of-Quarter Balances.
4. Selected Average Balances: this data is taken directly from Schedule RC-K of the Call Report
5. Balance Sheet Mix Analysis
6. Income Statement: income is presented for each quarter. The model takes the current quarter’s Schedule RI from the Call Report, which is YTD, and subtracts the prior quarter(s) from the same calendar year to arrive at the current quarter numbers.
7. Yields & Costs: these are calculated using the quarterly Average Balances reported in the Call Report and quarterly Interest Income/Expense data

This data is used to calculate the zero point on the Rate Shock of Income.

1. Performance History
2. **CALCULATIONS**

**Margin Risk Tolerance**

Margin Risk Tolerance is the ability to take potential losses to capital while still maintaining a ratio above the minimum capital level. Risk Tolerance is calculated by adding the minimum required earnings to meet capital and dividends and Other Expenses assumed by the bank for the coming year and subtracting the total from the Current Margin under flat rates applied to new Average Assets.

**Rate Sensitivity of Non-Maturing Balances & Betas**

Betas have three major uses for this Risk Analysis: Gap, Rate Shock, and calculation of Decay Terms. Betas represent a percentage of change in the bank’s interest rate for every 1.00% change in yield curve rates. As deposit products act differently to rate changes, review and adjust, as needed, the estimated Beta Values.

**Rate Sensitivity Gap Report**

If the sum of the balances from the maturity data above does not equal the balances on the Balance Sheet, then the program will put the difference into the >15-year bucket. Typically, these differences are due to non-performing loans or other investment securities without maturities that must be accounted for later in the market value calculation. Non Accruals are not included in Gap nor are they used in the Rate Shock of Net Interest Margin.

**GAP** can be viewed on the top portion of the Risk Sensitivity Gap Report. If all assumptions and adjustments to the bank information were turned off, RiskGPS would be identical to your Call Report information. Assumptions allow you to modify the information to capture a more realistic rate risk environment.

**Time-Weighted 12-month Gap** weights the report buckets according to their ability to reprice. The Floating bucket would be weighted at 100% as it is available over the entire 12-month period, the 1-3-month bucket at 83%, and the 3-12 month at 37.5%. Note: Loan, Security and Deposit Assumptions have a direct impact on how balances are distributed in each bucket.

**Net Interest Margin Simulation**

The Minimum Margin (FTE), represented in the ‘Rate Shocked Margin vs Minimum Margin’ graph by a red box, can be found on the Risk Tolerance Report. Shocked Margin (FTE) values, shown as yellow triangles in the graph, are impacted by Loan, Security, and Deposit assumptions. One recommended industry guideline is that the Percentage of Risk change in margin should not exceed a decline of -10% for every 200bp of shock.

**Back-testing**, shown as +/- bp at the bottom of the Back-testing Report, is the difference in the projected margin compared to the historical margin. A change of less than 10% is preferable. Subtracting the back-testing variance from the projected NIM will provide you with a worst-case scenario as compared to the calculated minimum margin displayed. The same recommended industry guideline that applied for Percentage of Risk change in margin on the 1yr Rate Shock also applies to the 2yr Rate Shock; not to exceed a decline of -10% for every 200bp of shock.

**Yield Curve Risk Assessment**

Yield Curve Risk Assessment, often referred to as Non-Parallel Yield Curve Shock, is performed by analyzing two major yield curve alternatives, in addition to the traditional Parallel Yield Rate Shock. By creating two variations, long- term rates flat/short-term rates rising, and short-term rates flat/long-term rates falling, the worst-case risk scenario can be examined in one easy to read report.

**Rate Shock Economic Value of Equity**

Current Value, also known as the zero point, has been marked-to-market from its present value. A recommended industry guideline is that the maximum change to MVE Risk should not exceed -20% for every 200bp change in rate shock.

**Rate Risk Management Strategy**

Duration values are affected by the model assumptions. The Margin Duration describes the movement of the bubbles (longer or shorter) and directly affects the Risk/Reward Trade-Off. By changing the assumptions, you can create different What-ifs and measure those effects on the Risk/Reward Trade-Off. Risk Reward Trade-Off is calculated by taking the Mismatch Risk Component, divided by the Margin Duration, multiplied by 100.

1. **PERFORMANCE FORECAST**

Weighted Average Rate Change is an important component in the forecasted ratios. The rate is applied to the Rate Shock Margin Simulation to determine where the bank’s margin would be if applying the rate change.

1. **ASSUMPTIONS**

After your initial review of the RiskGPS Analysis, you will want to review and modify the various assumptions. There are five assumption sections: Risk Tolerance, Loans, Securities, Deposits, and Reclassifications. The Call Report is primarily a data-gathering document and not a financial document; therefore, the information must be “prepared’ before it is to be used in analysis. The maturity data in the Call Report is stated as final maturity, or next repricing, which means that the actual cash flows need to be determined. In addition, some portion of the investment portfolio is callable and must be accounted for in possible cash flows. The assumption section of RiskGPS makes these areas available to you for modification.

Notes about modifying assumptions in RiskGPS:

1. Leaving a box blank signifies the default setting should be retained
2. Entering a zero indicates no balance or rate
3. Assumption changes are saved by clicking ‘OK’ at the bottom of the assumption screen
4. Entries can be cleared and the defaults restored by clicking ‘Clear Adjustments’
5. To refresh the screen and return to the previously saved changes, click ‘Reset’

**Risk Tolerance Assumptions**

For RiskGPS to calculate the minimum Net Interest Income (NII) for the bank it must determine all expenses, or cash flows, that the NII must cover. The **Risk Tolerance Report** contains a dollar value of the item, and to the immediate right, the system has calculated percentage of Earning Assets (EA) and the percentage of Average Assets (AA). Both are presented to accommodate the various ratios that bankers use in their measurement methods. The following are the assumptions that impact Risk Tolerance:

* System Estimates are default values based on the bank’s past activity as well as applying industry standards.
* **Minimum Capital Ratio**: RiskGPS defaults to a 7% minimum. Please enter your bank’s minimum Capital/Asset ratio as required and stated in your bank’s policy.
* **Total Asset Growth Rate**: RiskGPS will review both recent and long-term history to make an initial default (estimate) growth rate for the next 4 quarters. This rate will also be used in the Performance Forecast section of the system. You will need to enter the bank’s current year’s budgeted Total Asset Growth Rate.
* **Projected Dividends**: Based on the bank’s history, RiskGPS will forecast the estimated dividends expected to be paid over the next four quarters. These dividends will be used in the NII calculations. If you are anticipating a capital injection, enter that here as a negative, or contra, dividend.
* **Projected Non-Interest Income, Non-Interest Expense, and Provision for Loan Loss**: These are estimated based on the bank’s history, as the values over the previous four quarters are summed and divided by the YTD Average Earning Assets (last 4 quarters Avg. Earn. Assets/4). RiskGPS then applies the ratio to the projected Average Earning Assets (see Risk Tolerance report). The user is encouraged to revise the amounts to better reflect what the bank estimates will be occurring over the next four quarters.
* **Tax Equivalent Adjustments (TE)**: for tax estimates, please edit the following as needed:
* Estimated Effective Tax Rate: enter this as an annual percentage
* “S” Corp? Yes/No: select the appropriate tax condition for your bank.

**Loan Assumptions**

1. Market Rate for Loans Used as Discount Rate: also known as the Average Rate expected for New Loans. This rate serves multiple purposes. First, this rate is used as the discount rate on Loans when calculating their Market Value for the EVE shock analysis. Secondly, it represents the repricing rate on all contractual run-offs, i.e., loan maturities and prepayments. Important: a system estimate is supplied for you; we recommend you review and edit as appropriate.
2. All Other Loans - (all loans excluding 1-4 Fam Res Mtgs): all of the bank’s loans excluding Residential 1-4 family closed end loans and fixed rate loans. The Call Report requires banks to classify Floating Rate Loans that have reached their floor as Fixed. Therefore, maturity schedules as stated in the bank’s Call Report, when combined with repricing data, may not be a true indicator of the bank’s interest rate risk position.

RiskGPS’s loan assumptions provide you with the ability to distribute floating loans into three categories: Floating without a Floor, Floating Above Floor, and Floating At their Floor. *It is possible that the total of all three assumption categories may not equal Total Other Loans, as you may have traditional fixed balances remaining in the category. For Floating above and at Floor volumes, RiskGPS will limit your entries so not to exceed the amount of Total Other Loans, less any entries made to Volume of Loans Floating without a Floor. You will be automatically notified if you violate this restriction.*

1. **Volume of Loans Floating without a Floor**: this field is available so you may identify that portion of the amount reported in the 1-3 month maturity bucket of the call report that are immediately available for repricing. RiskGPS may provide an estimate, or system default, for you. You are encouraged to edit this assumption to coincide with your bank loan reports. Note: Your entry for Floating Loan volumes cannot exceed that which was reported in your 1-3 month maturity bucket on the call report. You will be notified in the event this occurs. Floating loans without a floor reprice using our calculated rate for All Other Loans. If you supply information for ‘Floating Loans Above Floor’, your user-defined Weighted Average Contractual (Indexed) Rate will be used in replacement of the rate on All Other Loans.
2. **Floating Loans Above Floor**: enter Other Loan balances which have a floating/variable rate but are governed by a floor. In this situation, the balances will reprice freely during a rate shock simulation until rates decline to the point they hit their floor. When this condition is met, RiskGPS will treat them as a fixed rate loan. This will demonstrate the protective nature of interest that these loan types have in a declining rate environment.

* **Weighted Average Yield on Floating Loans Above Floor**: this is the weighted average yield on loans in this category and may be the same or very close to the Contractual (Indexed) Rate for Floating Loans Above Floor. This yield will be used in the calculation of exiting interest for each shock calculation. If you do not enter a weighted average yield, the system will use the estimated yield based on your call report data.
* **Weighted Average Contractual (Indexed Rate) for Floating Loans Above Floor**: for the Contractual Rate, also known as Indexed Rate, enter what the weighted average yield would be if there were no floors or ceilings. For example, if these loans were priced at Prime plus a spread, where Prime = 8.5% and the weighted average spread is 50bps, then the Weighted Average Contractual/Indexed Rate would be 9.0%. In many cases, the Weighted Average Yield and the Weighted Average Contractual/Indexed Rate may be the same. With this information, the model is trying to determine if, and when, the cash flows will change with rising rates, i.e., when will they move out of fixed (amortizing) and reprice as Floating.
* The weighted average contractual (indexed) rate for floating loans above floor should be higher than the floor rate as they are not yet at their floor

1. **Floating Loans At their Floor**: This assumption allows you to break out floating loans currently at their floor, reported as Fixed in your call report, so that during a rate shock simulation, RiskGPS will allow these volumes to reprice again when the rates exceed the current floor. This will have a favorable impact on interest in a rising rate shock environment.

* The weighted average contractual (indexed) rate for floating loans at their floor should be at or lower than the floor rate as they are currently at their floor

**Adjustable Rate Mortgages (ARMs)**: If entered, RiskGPS will use the data you've supplied to reprice volumes in the middle of the time bucket in which they are entered, in their entirety, while being held to their Floor or Ceiling. The model will total the volumes and verify that the ARM and Fixed values equal the total RE 1-4 family values you entered on your most recent Call Report. Note: The volume in each period cannot exceed the total amount of that same period in the Call Report.

* **Weighted Average Contractual (Indexed) Rate:** this line enables you to define what the ARM balance is currently earning (when it is between the Floor and Ceiling), or what rate the ARMs would be earning if they were not currently at the Floor or Ceiling.
* Entering this data will provide the model with the detail needed to better analyze the impact of these repricings on Margin and Economic Value of Equity (EVE).

**Amortize Loans? Setting**

If your maturity data is recorded in the Call Report at its final maturity date (full term), the Loan Amortization feature allows RiskGPS to modify those maturities by selecting the “Yes” option next to ‘Amortize Loans?'. If your loan portfolio consists mostly of repriceable loans and you record their maturities at their first repricing date, then select “No”. See the GAP report for original and revised maturity distributions.

**Loan Prepayment Percentages (CPR) at various rate levels (applies to all loans and mortgage backed securities)**

Plansmith defaults for **Prepayment Assumptions** are estimates based on Plansmith’s analysis of recent industry client data. The user should review these assumptions and make changes appropriate to their bank’s risk profile and to market conditions. *It is highly recommended that you run alternative prepayment scenarios to analyze the impact on results due to assumption changes*. Note: If changing the default settings, it is important that you document the reasoning or methodology behind the assumption changes. *Prepayments will reprice at the current Loan Yield, or the User Defined Discount/Avg. Rate on New Loans, located at the top of the Loan Assumption entry form.*

Example of the method to estimate Immediate Repriceable loans:

Loan maturities reported in your FFIEC Call Report for the first two years are grouped into the following time buckets: 1-3-month, 3-12 months, and 1-3 years. When running a Rate Shock Analysis this data may be missing a key element, Immediately Repricing Loans. Using deductive methods, RiskGPS looks at the original maturities reported for non-RE loans.

* We assume that the 1-3 month bucket contains loans repricing in the Immediate, as well as any dollars maturing between 1-3 months.
* We can also assume that the payments expected for the 3-12-month bucket are fairly close to those payments made in the previous period.
* Therefore, we divide the 3-12-month bucket by 3 to estimate one quarter of maturity payments.
* If then, that same amount represents one quarter of maturity data in the 1-3-month bucket, then we can deduct it leaving us with the amount that is most likely Immediately Repriceable.

**Securities Assumptions**

Security cash flows are divided into several categories: U.S. Government Securities, US Agency Securities, State & Political, Mortgage Backs & Other Debt Securities. Treasury and Municipal Securities are reported as bullet bonds using only the stated maturities.

Regarding the Default assumptions and the User Defined Options available: Maturity of Interest Bearing Deposits in Other Banks, Reverse Repo Maturities, and Repurchase Agreements will default to 6 months. Remember, if the User Defined area remains blank, RiskGPS will use the default information. If you wish to change the maturity, enter the number of months each type is most likely to be held for. If you do not have any balances in these categories, no action is necessary.

**US Agency Callable Percentage**

You may adjust the callable values in one of two ways:

a) Edit the Spread / Percentage Called

b) Edit the maturity distribution brought forward from the Call Report

*US Government Agency Security maturities can have contractual callable options. This assumption allows you to estimate the percentage of your portfolio that has contractual calls, and to identify the average spread (rate drop) in which it would produce the call. RiskGPS will default to 50% of the portfolio at a 50bp rate change. Using this estimate, the system subtracts 50bp from the current Agency yield and compares that to the current 2-Yr Treasury Bill Rate (see Performance Forecast). If the Agency yield is higher, 50% of the Agency balances will be called and placed in the 1-3-month maturity category. This relationship is dynamic and will change as the rate levels adjust during Rate Shock Simulation.*

Editing the maturity distribution will take precedence over the percentage option. If editing the maturity distribution in any given line, you must complete the entire line of information. If the sum of the maturities from the maturity data does not equal the balance on the balance sheet, then the program will put the difference into the >15-year bucket on the Gap Report. Typically, these differences are due to other investment securities without maturities that must be accounted for later in the market value calculation.

**Dividends on Equity Securities**: Dividends on Equity and Funds is different from normal yields on securities, in that they are not subject to rate changes and therefore are not part of the rate shock calculations. They are estimated by the program and taken from the Call Report line interest & dividend income for calculating the Yield on Securities used in Rate Shock calculations.

Based on the default data or your adjustments to the assumptions, RiskGPS will calculate the Duration and the Market Value for your Securities Portfolio at each Shock increment.

**User Defined Market Value/Duration**: You may further define your securities values by requesting a rate shock market value report from your broker and entering the values in RiskGPS. Once defined by the user, the user defined Decay values will be calculated and displayed. Select ‘OK’ – to save. The system automatically recalculates both Duration and Market Value.

**DEPOSIT ASSUMPTIONS**

Based on your bank’s historical rate relationship to changes in the yield curve, RiskGPS will estimate bank-specific betas. ***Betas*** *represent the percentage of change in the bank’s interest rate for every 1.00% change in yield curve rates.* For example, entering a 25% in the User Defined box for Beta for Checking (Interest Bearing) tells the RiskGPS model that your bank intends to increase its interest rate by 0.25 for every 1% rise in yield curve rates. As deposit products react differently to rate change, we ask you to review and adjust the estimated Beta values as necessary.

*Changes in the Betas will affect the* ***Decay Rates*** *in the section below the Betas. Therefore, if you make changes to Betas, select ‘OK’ then return to the Deposit Assumptions page to review the revised decay information.*

**Decay Term** information affects the market value associated with non-maturing deposits reported on the Rate Shocked Economic Value of Equity. Typically, the more rate sensitive the deposit, the shorter the decay. However, if the customer base has a history of long-term retention, then the decay value can be changed, and, in most cases, extended. In such a case, the longer the decay of the deposit the greater the market value will fluctuate. Although the model will suggest appropriate decay terms based upon the current betas for non-maturing balance repricing, the user is asked to examine each decay term and determine if they are accurate.

For example: Money Market Accounts typically have short decay terms in fluctuating rate environments as the customer moves their balances more frequently to get the best rate of return. In stagnate or falling rate conditions, your MMDA customer is more likely to stay put, i.e., have a longer decay. There may be conditions that contradict these situations. You can customize the decay term to describe current customer behavior.

***Discount Rates*** *are used to determine the current and shocked market value of deposit balances. As each deposit has a decay term or actual maturity, it has a duration. The account’s duration is matched up with its counterpart on the yield curve for assigning the discount rate. If a balance category has $0 balances, the Fed Funds rate is displayed as a system default for the Discount Rate.*

**RECLASSIFICATION ASSUMPTIONS**

Some banks reclassify non-maturing deposit balances to recognize sweep accounts and to reduce assessment fees. This can distort the calculation of interest expense and cost rate. If your bank has engaged in this activity, it is necessary to re-state these reclassifications to obtain a better estimate of cost rate for rate shock purposes. The program allows the user to load a restatement of MMDA and Savings balances for the past five quarters and save them. If this does not apply to your institution, no action is required.

**Back-Testing in RiskGPS:**

In RiskGPS, back-testing compares the actual changes in Net Interest Margin (NIM) and Interest Rates over the past year with the predicted results from last year's Rate Shock Analysis.

**Rate Forecast Comparison:**

* The model uses the Blue-Chip Financial Forecast to compare actual and projected average rates for the current year.
* The difference between the current year's average rates and the previous year's fourth-quarter rates is calculated.
* Rate changes are then weighted based on the bank’s balance sheet volumes for each category, and an overall weighted average rate change is determined.

**Net Interest Margin (NIM) Comparison:**

* The system calculates the current year's average NIM and compares it to the fourth-quarter NIM from the previous year to determine the actual change.
* The projected NIM change is derived from the rate-shock data using the weighted average rate change, with interpolation between rate shock increments.
* NIM shock analytics from last year’s simulations are used to calculate the projected NIM based on historical data and system defaults.

The **Back-testing report** displays results for the past four years, including the average error for each year, helping to assess the accuracy of previous rate shock projections.

**RiskGPS: Strategy Bank Sample Report**

**Introduction**

The purpose of the RiskGPS analysis is to provide community bankers with an economical tool with which to determine rate risk and prepare for IRR examinations. It combines up to 20 quarters of the bank's financial history from call reports with required rate risk measurement techniques to produce an estimate of both interest margin and equity risks. With these reports, the user can easily understand, communicate and prepare for the impact of rate changes with minimal costs, staff and time.

**Risk Analysis Methods**

The system provides several methods for measuring interest rate risk. *Risk to the net interest margin is measured using the Rate Sensitivity Gap Analysis to show cash flow and repricing information and then margin simulation to quantify the actual income risk.* While net interest margin risk is a short-term (12-month) measure, longer term risks to the bank’s performance can be seen by computing Economic Value of the bank’s Equity (EVE). *The EVE is the present value at various interest levels.*

**Plansmith’s Risk Tolerance Analysis**

Risk is always present in the balance sheet; however, the severity of risk has meaning only when placed in context. To understand the severity of the present, we must understand the bank’s ability to absorb losses, its Rate Risk Tolerance. Plansmith’s Risk Tolerance Analysis is the benchmark against which risk can be determined to be acceptable or excessive. Risk Tolerance also provides insights into the components of performance that can reduce pressure on the net interest margin when few alternatives exist. This unique analysis aids understanding by bringing a new dimension to the interest rate risk equation.

**Rate Risk Strategy Development**

The RiskGPS report provides traditional risk measurements along with a unique technique to help control rate risk called Asset Liability Strategy Bubbles. In one chart, all components of risk are brought together visually to depict the risk to both net interest margin and EVE, as well as the underlying causes. This view allows the reader to quickly and easily comprehend the scope of the problem, as well as the solution with its Risk/Reward trade-off.

**The Data Source**

The RiskGPS analyses are developed using the bank’s Call Report history as taken from the FFIEC database, as well as some external data. The system examines data covering up to 20 quarters within the context of a full rate cycle giving greater validity to the results. Call Report data provides several benefits: 1) no additional staff time is required to prepare and load data, 2) historical performance statistics with which to discern the bank’s behavioral characteristics, and 3) the ability to test the model accuracy against known historical results, or back-testing.

**Understanding and Communicating Risk**

Rate risk analysis can be complex, and often the real challenge lies in the explanation of risk to boards, staff, and examiners. Systems that present several pages of detailed schedules obscure the issues rather than clarify them and inhibit strategy development. To overcome these problems, this report reduces the analyses to easily read charts and graphs supported by explanations. The goal of RiskGPS is to improve both understanding and communication of the bank’s risks and the strategies for dealing with those risks. Understanding and communicating risk is at the heart of the concerns of banking regulators.

**A Word About Accuracy**

RiskGPS users should recognize that, while the data used in the analyses are limited to the Call Report detail, the results are within an acceptable range of accuracy for an uncomplicated community bank. Risk measurement itself is an imprecise science where all results are estimates at best. RiskGPS provides a reasonable assessment of interest rate risk with a minimal investment of both time and expense. We say that it is the 90/10 rule, that is, it provides 90% of the answers with only 10% of the effort and cost. If due to the complexity of the balance sheet the bank requires a more detailed analysis, Plansmith’s Financial Compass system provides additional capacity and capability. It is a complete bank simulator that provides greater granularity with more detailed assumptions to deal with complex instruments. ***Financial Compass©*** is an instrument-level analysis system that pulls its data from the bank’s accounting systems on a monthly basis. To learn more about Plansmith’s complete range of products and services, call Plansmith at 800-323-3281.

**Executive Summary**

**Net Interest Margin Assessment**

Bank management must ensure that risk is measured over a potential range of interest rate changes including both parallel and non-parallel yield curve shifts.

**Economic Value of Equity**

The Economic Value of Equity is a function of the duration difference between assets and liabilities. The severity of potential loss is measured by the Equity Risk Cushion which tells whether the bank is able to absorb a loss and maintain the minimum equity ratio.

**What to Expect**

RiskGPS transforms a bank's Call Report data into a credible interest rate risk analysis. This is a multi-step process. The results of all these analyses have been summarized in the Executive Summary (page 2 of the RiskGPS report).

* 1. **Risk Tolerance**

The first requirement is to determine the benchmark against which to measure the severity of the risk the analysis will measure. This benchmark is the bank’s minimum required interest income. *The ability to absorb income loss and maintain adequate equity is called Risk Tolerance.*

1. **Data Conversion and Gap**

While Call Report data is a rich source of information, it must be modified for risk measurement to be accurate and credible. This is a three-step process:

1. Determine the rate sensitivity of the non-maturing balances using their beta factors. The beta factors are the repricing speeds in the Gap report and in Rate Shock Simulations
2. Convert loan maturities to cash flows by amortizing their cash flows and applying current prepayment speeds.
3. Estimate the volume of floating rate loans to perform an accurate simulation of income as rates change.

The RiskGPS user has access to all System Estimates and can adjust these values to reflect management’s own analysis.

1. **Rate Shock Simulation of Income**

RiskGPS performs a full simulation of each balance sheet category under various rate change conditions and calculates the net interest income change for each. A convenient chart shows the impact of rate change over various rate changes and relates the Net Interest Income ratio (% of Earning Assets) to the bank’s required Net Interest Margin developed in Risk Tolerance. This is very helpful when presenting risk issues to the board.

1. **Economic Value of Equity Risk**

*Economic Value of Equity (EVE) is the present value of assets less the present value of liabilities. Present value is calculated using the discounted cash flow method for all balance sheet items.* The difference between the assets and liabilities at each rate level is the bank’s equity on a present value basis. Critical measurements include both the current EVE and the rate of change of equity as rates change. A convenient chart illustrates the changing nature of this value as compared to the bank’s minimum Equity Ratio. The actual value is shown under the chart on page 18.

**Risk Management Strategy**

RiskGPS provides a simple device to help explain and manage risk. By charting the duration of assets and liabilities and their yields against the yield curve, we can separate the components of the interest margin into the asset benefit, the liability benefit, and that portion of the margin due to risk taking.

**Performance Projections**

*Using the results of the Net Interest Margin simulation, combined with a credible rate forecast and operating overhead projections, RiskGPS presents a performance forecast for the next four quarters.*

**Margin Risk Tolerance**

To provide meaning to rate risk measurements we must set benchmarks against which the sensitivity of risk can be evaluated. The severity of a potential loss depends upon how much the bank can afford to lose and not impair capital. The ability to absorb losses and still maintain adequate capital is called Risk Tolerance. Risk can be classified as either short-term or long-term. *Short-term risk impacts margin earnings in the near term. The Economic Value of the bank's Equity (EVE) reflects the long-term risk to earnings. Margin Risk Tolerance is determined by computing the minimum net interest margin required to meet all expenses, including capital formation and dividends. The Tier 1 Equity Risk Tolerance is the difference between the minimum acceptable capital ratio and the bank's capital ratio*. This value provides a measurement of the bank's ability to lose capital and still maintain its minimum capital ratio. *Tier 1 Equity Risk Tolerance is determined by subtracting the minimum capital ratio from its capital ratio.*

*Risk Tolerance tells us how much the net interest margin could change before the bank’s capital falls below the current or minimum amount due to insufficient capital formation from earnings.* *A positive value indicates the bank can absorb adverse rate changes in the net interest margin. A negative Risk Tolerance indicates the capital ratio will decline even without rate change. The Risk Limit is the maximum percentage NIM change from the Current Margin (under flat rates) before the bank’s capital falls below the current amount or the designated minimum required amount, whichever is higher.*

**Factors Impacting Risk Tolerance**

The Rate Risk Tolerance calculation addresses asset liability management in a holistic manner. It recognizes that net interest margin and margin risk are not independent of other aspects of the bank's financial issues. No part of the bank's financial statement stands alone. Focus should be on the bottom line rather than margin or overhead alone. Risk Tolerance can explain why some banks can operate with narrow margins and continue to generate substantial returns for their shareholders, while others achieve large margins and yet bring only 50 basis points to the bottom line. Banks can relieve pressure on the margin by taking steps to reduce those components of Risk Tolerance that cause the minimum margin to increase. By the same token, banks with an adequate Risk Tolerance position could find, for reasons other than rate change, their Risk Tolerance evaporates. This is due, of course, to changes in the components of the bank's Risk Tolerance such as loan losses or increasing operating expenses.

**Rate Sensitivity of Non-Maturing Balances**

Cost of Funds Rate (COFR) for non-maturing deposits (Interest Bearing Checking, MMDA and Savings) is under direct control of the bank. However, there is often a relationship between interest rates and the yields on these accounts. RiskGPS attempts to uncover this relationship and use it to determine the COFR behavior on these non-maturing deposit accounts as rates rise and fall. To accomplish this, RiskGPS identifies historical periods of sustained interest rate change, one rising and one falling. We then correlate the change of interest rates and the COFR for these periods. The correlation is called the Beta. The system uses the Beta to determine the COFR as interest rates rise and fall. Note: in the case this correlation is negative, we say the correlation is indeterminate and set the Beta to zero.

While the system uses history to develop Betas, COFR is at the discretion of the bank and is a product of many factors including both rate change and competition. It is important for RiskGPS users to determine the reasonableness of the default Beta approximations. Users can modify these assumptions and incorporate all known factors into their Beta assumptions.

**Estimating the Beta**

*The best way to estimate how the COFR will change is to ask the question, if interest rates were to rise 100bp over the next year, how much would the bank change its COFR? The same question is valid for falling rate conditions.* This value is essentially the Beta for that account. For example, if you think that if interest rates were to rise 100bp and your COFR on an account would increase 25bp, then the Beta is 25%.

**Rate Sensitivity Gap**

The first requirement is to adjust the Call Report amortizing accounts to cash flow. These include the MBS & CMO as well as the Loan accounts. Following amortization, prepayment speeds are applied. Finally, the Floating Rate Loans are estimated by subtracting the averages maturity from Loans Repricing < 3 months.

Non-Maturing Deposits are distributed using the Beta Factors calculated on page 13 of the RiskGPS report. The Beta reflects the bank's propensity to adjust offering rates as interest rates change. These Betas should be reviewed and adjusted in the Assumption/Gap section of the program. CD maturities are taken from the Call Report. The user is advised to review these adjustments and make refinements using the Assumptions screens (accessed through the main menu).

**Net Interest Margin Simulations (1-Year Rate Shock)**

Gap Analysis provides the basis for more detailed analysis in RiskGPS. Gap results are popular rate risk indicators. However, to truly evaluate the impact of rate change on income, simulation is the best technique because variables are changed for the various rate conditions. Each category's interest change is calculated as rates move up and down. In addition, the prepayment speeds and repricing speeds are changed.

*Rate Shock is a method for stress testing Net Interest Margin (NIM) over the next four quarters under several rate change levels.* These levels span 100bp increments, up and down 400, from the current interest rates. To simulate activity, maturing balances are replaced with new balances at the new rate level, and repricing balances are adjusted to the new rate shock level. The interest is recalculated for each level along with the new average yield. NIM is then calculated, and a margin risk profile is developed.

When the Interest Income is translated into Net Interest Margin as a % of current Earning Assets, we can compare the simulated margins over rate changes to the bank's minimum required margin found in Risk Tolerance.

**Net Interest Margin Simulations (2-Year Rate Shock)**

The January 2010 Advisory on Interest Rate Risk released by the joint regulatory agencies recommends that the time horizon of the Rate Shock of Margin Simulation represents rate shocked income spanning two full years. RiskGPS calculates the income change for each shock level and displays the cumulative income and expense over the two-year time frame.

As in the one-year analysis, the shock increments are 100bp up and down. These are immediate and sustained movements and are applied to the re-pricing data for each period. Prepayment speeds, callable information as well as all other assumptions used in the one-year are also used in the 2-year analysis. All the change ratios in the table are calculated as changes from the zero (current) column.

While the income in the table is cumulative, the Net Interest Margin is stated as a ratio in the chart to maintain consistency. Since the analysis requires a flat (no growth) balance sheet, the current end of period asset value is used to calculate the NIM (Tax Equivalent)

**Using the Rate Shock graph to predict margin**

In the performance projections (page 20) section of RiskGPS, the chart is combined with a professional rate forecast to project the bank's overall margin for the next four quarters. Using the Weighted Average Rate change, based on the bank's balance sheet structure and the forecast yield curve, we find the rate change on the Shock Level axis (X-axis); we then refer to the Rate Shocked Margin line to find the projected margin as a percent of Average Earning Assets. The RiskGPS user will note a difference between the margin value derived here and the value reported on the Performance Projections page. The reason for this is that the analysis is based upon Average Earning Assets while the Performance Projections value is based on Total Average Assets which allows us to compute the bank's projected ROA.

**Yield Curve Risk Assessment**

Using sensitivity analysis, we can determine a worst-case impact on Net Interest Income from a non-parallel shift in the yield curve. The long-end of the curve generally drives the asset yields, and the short-end tends to most significantly impact the cost of liabilities.

To create a sufficiently meaningful yield curve shift we use two approaches. In the first scenario, long-term rates remain unchanged while short-term rates rise to a point where the yield curve becomes slightly inverted. In the second scenario, long-term rates fall as far as possible while short-term rates remain unchanged. The worst-case scenario will allow us to assess the bank’s yield curve risk. These two scenarios are depicted in the charts on page 13 of RiskGPS.The results of these two methods determine the worst-case impact on NIM and Equity.

**Rate Shocked Economic Value of Equity**

Economic Value of Equity (EVE) is a measure of long-term interest rate risk. EVE is the present value of assets less the present value of liabilities. In this analysis, RiskGPS calculates the discounted cash flow (present value) of each category on the balance sheet under each of nine rate conditions (+/-400 and the Current (zero) point).

*The percentage of change in EVE is called the Duration of Equity and is a measure of the volatility of value and, therefore, risk. Duration is the percent change in value for each 100bp change in rate and has the dimensions of time, months or years. Each year equals a 1% change in present value for 100bp change in rates. Because duration has dimensions of time, longer duration equals greater risk.*

EVE calculations require good cash flows, as well as some knowledge of embedded options for reasonable accuracy. Because RiskGPS is calculating cash flows, it is possible to estimate the maturity and prepayments at all rate levels in order to approximate durations. The present values for the major categories at various rate change levels are calculated using their durations. Loan Present values are computed using discounted cash flows and current market rates. The Fair Value of Securities at the zero point is taken from the Call Report.

RiskGPS users are encouraged to review all assumptions for bond maturities, securities, durations, loan prepayments, and maturity of borrowings. The bank's Equity Risk provides a long-term perspective on earnings due to rate change.

**Rate Risk Management Strategy**

Risk is present when there is a repricing term mismatch between assets and liabilities. If the volume and term of these opposing balances were equal and priced off of the same indexes, theoretically there would be no interest rate risk. The reality is, however, that there is a mismatch. Gap is one technique for measuring this mismatch; **Plansmith's Risk Management Bubbles** are another. The Bubbles method is like a visual Gap report; however, there are 3 differences: 1) bubbles are easier to understand, 2) bubbles account for the entire term of the bank's position, and 3) by including the current Yield Curve, the risk management strategy is more apparent.

There are also 3 elements in the Bubbles method: 1) The term and yield of assets (the yields are not tax equivalent), 2) the term and cost of liabilities, and 3) the Yield Curve. Now we can quantify the components of the margin; the Asset Benefit (the vertical distance from the Asset Bubble to the Yield Curve), the Deposit Benefit (the distance from the Liability Bubble to the Yield Curve), and the Basis Risk Component (the vertical distance in the Yield Curve between Asset and Liability Bubbles). Dividing the Basis Risk Component (basis points) by the Duration Mismatch (months) quantifies the Risk/Reward Trade-Off.

Dividing the Risk Component by Margin Duration gives us the **Risk/Reward Trade-Off**. This means that for each month the margin duration increases (risk), margin (reward) will change by the slope of the Yield Curve. This assumes the asset or liability yields maintain their spread to the Yield Curve as they move.

**Performance Forecasts**

This performance forecast combines the **Blue Chip Financial Forecast's** interest rate projections with the Rate Shock Simulation. Since the margin has been computed for various rate changes, we need only apply the rate forecast from Blue Chip. The first step is to determine the overall rate change based on the distribution of the assets and liabilities along the Yield Curve and Prime Rate. Next, the weighting factors are determined as the percentage of assets and liabilities influenced by these rates. From this, the Weighted Average Rate Change is computed to be used in the Simulation.

**Risk Tolerance Assumptions**

The assumptions used on the Risk Tolerance Assumptions page are applied only to the Margin Risk Tolerance Report (page 11) and Performance Forecast Report (page 20). *The Risk Tolerance assumptions are not applied to Net Interest Margin Simulations, Rate Shocked EVE, or Rate Sensitivity Gap.*

Values calculated from the Risk Tolerance Analysis will set the benchmark for which the bank’s Net Interest Margin will be measured. The system estimates are based on the bank’s past activity as well as applying industry standards. Review and adjust entries representing the values over the next 4 quarters.

**Loan Assumptions**

System Estimates are calculated based on the bank’s past activity. It is important to review and adjust as needed to capture the bank’s current position more accurately. A ‘blank’ under User Defined defaults to the System Estimate values. **Note:** The Call report requires banks to classify Floating Rate Loans that have reached their floor as Fixed. Their maturity is therefore reported at its final maturity date. By providing more detail on the Loan Assumptions screen, RiskGPS can automatically move these balances back to Floating when the rate shock level causes them to exceed their floor.

**All Other Loans – (all loans excluding 1-4 Fam Res Mtgs)**

**Note:** Please fill in the weighted rates for Floating Loans. For the Contractual Rate (also known as Indexed Rate), enter what the weighted average yield would be if there were no floors or ceilings.  For example, if these loans are priced at Prime plus a spread, and Prime = 8.50% and the weighted average spread is 50bp, then the Weighted Average Contractual (Indexed) Rate is 9.0%.

**Deposit Assumptions**

\*System Estimates are based on Treasury Yield Curve with similar durations.

**Back-Testing**

To validate the accuracy of the model, the system performs back-testing of results by comparing the difference between calculated Net Interest Margin and Actual Net Interest Margin over 4 years. It then averages the absolute values of those differences to determine an Average Error. ‘N/A’ indicates back-testing data analytics exceeded a +/-0.75 margin of error threshold. This threshold applied to periods prior to YE 2023 - YE 2024.

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| --- | --- | --- |
| GLOSSARY OF TERMS | | |
| Term | | Definition |
|  | |  |
|  | |  |
| Average 12 Month Gap | | The time-weighted average gap over the next four quarters. In the calculation, each incremental gap is weighted based on the remaining time left until the end of the year. |
| Average Term | | The time-weighted average maturity or repricing of assets and liabilities. |
| Beta Adjustment | | The percentage of total outstandings for a non-maturing balance sheet category, derived from the correlation between offering rate changes and interest rate changes. These balances will be placed in the floating bucket of the Gap report. The remaining balances are to be placed outside the gap window in the 1-3-year time bucket. These categories are: Int Bear Chkg, Svgs, & MMDAs. |
| Capital Risk Tolerance | | The reduction in bank equity that would cause the equity to fall to the minimum required ratio-to-assets. It is computed as the current capital minus the minimum capital required. |
| Cumulative Gap | | The sum of the periodic rate sensitivity gaps over the next 12 months. |
| Dollars at Risk | | The actual income loss in dollars due to rate change from the current level. It is computed by subtracting the net interest income, at each Rate Shock level, from the current or zero change level. Only potential losses are reported. |
| Duration | | The percent change in market value (price) of a financial instrument for every 100bp change in interest rates. Duration is usually expressed in months. Divide the Duration in months by 12 to convert to a percentage. |
| Economic Value of Equity (EVE) | | EVE is the present value of assets less the present value of liabilities using a discounted cash flow method. |
| Floating | | A time bucket in the Gap report indicating immediately repriceable and floating rate balances. In the Rate Shock analysis, rates on these balances will change as rates change. |
| Fully Tax Equivalent  (FTE) | | This is the adjustment to yield and margin that accounts for the non-taxable or partial taxability of some investments and loans. |
| Margin Risk Tolerance | | The difference between the bank's current net interest margin and its minimum required margin needed to meet all expenditures, including dividends and capital formation (if needed). |
| Market Rate | | This is the current competitive rate on new loans within the bank's trade area. The market rate is used as the discounting rate in the market value calculation. |
| Minimum Margin | This is the net interest margin needed to meet all expenditures as well as dividends and capital formation if needed. If the net interest margin falls below the minimum, then capital formation, and ultimately the capital ratio, will fall. | |
| Rate Sensitivity Gap | | The difference between repricing or maturing assets and liabilities in a given time period. |
| Rate Speed Change  Adjustment | | Rate change speed for non-maturing balances analyzed from historical data to calibrate their change relative to interest rate changes. This typically has the effect of lengthening the average repricing life of these balances. |
| Rate Shock | | A technique that simulates immediate and sustained rate changes over the next twelve months, and the investment of maturity cash flows and repricing of both earning assets and interest-bearing liabilities. The results show the behavior of the bank's interest margin as rates move up and down. |
| Risk Cushion | | The difference between the risk adjusted margin for a 100bp rate change, or the risk adjusted capital for a 100bp rate change, and the current margin or capital. |

RiskGPS: FAQ – System-Wide Updates

**FAQ: What is a system-wide update?**

About 5-7 business days after the filing deadline, we automatically import Call Report data for every bank   
in the country. Once this import is complete, the new quarterly data is available by default and the previous quarter’s data becomes historical.

**FAQ: When do system-wide updates usually occur?**

*System-wide updates generally occur 5-7 business days after the Call Report filing deadline.*

**FAQ: What if I need to run my reports before the system-wide update?**

Approximately 5-7 business days after the close of a quarter, you can easily upload your TRN file to BankersGPS.

You have 2 options for doing this using the “Data Update” menu item. First, click ‘Upload TRN’ from the dropdown menu. Then choose the method you prefer:

1. To import your current quarter TRN file from the FDIC, click the **‘Load from FDIC’ button**. Note: it generally takes about 24-hours after filing for your TRN to become available from the FFIEC.
2. To upload your TRN file from a location on your PC or server, click **‘Choose File’**, browse to the location on your PC or company server, then click **‘Upload’**.

**FAQ: What if we file an amended Call Report?**

While uncommon, some clients file an amended Call Report after they have uploaded their TRN file to RiskGPS but before the system-wide update occurs. If this is the case for you, click the ‘**Data Update**’ item in the main menu, then select ‘**Reload**’ from the dropdown menu.

**FAQ: What does Rollback mean?**

The “**Rollback**” option in the Data Update menu is intended for users who have uploaded their current quarter TRN but need to revert to the previous (default) quarter after doing so. Once the system-wide update takes place, this option is unavailable until the next TRN upload period.

**FAQ: Can I run the previous quarter’s report in BankersGPS?**

*Past reports are not archived within BankersGPS.* *We strongly recommend that you keep a .pdf copy of   
all quarterly reports on your PC or company server, so you always have a backup.*

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| **What is the difference between average and weighted average in the RiskGPS Loan Assumptions?**  There is a distinction and mathematical difference between a simple average and a weighted average, and they have very different results.    Here is an example highlighting the outcome difference when using the two methods: |

|  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |
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| |  |  |  |  | | --- | --- | --- | --- | | **Example: Average Yield on  Floating Loans Above Floor** | | | | |  | Avg Bal | Int Rate (Yield) | | Loan A | 100,000 | 6.00% | | Loan B | 300,000 | 5.00% | | Loan C | 600,000 | 7.00% | | Sum |  | 18.00% | | Total # Loans |  | 3 | | Avg Yield (Sum of Int Rates / # Loans) |  | **6.00%** |  |  |  |  |  | | --- | --- | --- | --- | | **Example: Weighted Average Yield on  Floating Loans Above Floor** | | | | |  | Avg Bal | Int Rate (Yield) | Interest Amt | | Loan A | 100,000 | 6.00% | 6,000 | | Loan B | 300,000 | 5.00% | 15,000 | | Loan C | 600,000 | 7.00% | 42,000 | | Sum | 1,000,000 |  | 63,000 | | Total # Loans |  |  |  | | Weighted Avg Yield (Sum of Int Amt / Sum of Avg Balances) |  |  | **6.30%** | |  |
|  |  |
| * Average Yield may not fully reflect the impact of different loans in the portfolio, especially if loan sizes vary significantly * In contrast, Weighted Average Yield considers the size of each loan, making it more sensitive to the yields of larger loans   As you can see in this example, the weighted average yield is higher than the simple average yield. This is due to Loan C having the highest yield and the largest balance, which has a greater impact on the weighted average than the simple average.    *Weighted values are generally provided for you through your core loan application.* |  |