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Develop Business/Financial Planning

## 6 Stress Tests for the Retirement Plan: How Big Is the Cushion?

By Jim Otar, CMT, CFP  
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**Even high-net-worth clients worry about outliving their retirement assets. Reassure them by conducting a stress test that quantifies exactly how inflation, market returns, and unanticipated needs could affect their retirement plan.**

The single most important question about retirement is "Do we have enough money to retire?" One way to answer that question is to measure the financial capacity of clients by categorizing them into one of the three [retirement zones](#): red, green and gray. Once I figure out a particular client's zone, it is a lot easier to suggest the right strategies.

Red-zone and some gray-zone clients have some tough choices to make: keep working, spend less, save more, rent out part of your house, and so on. However, this article is not about the red- or gray-zone clients. It is about those who have made it successfully to retirement and are already deep in the green zone.

You probably have retired clients who are deep in the green zone, mostly those who are high net worth. They are usually the ones with ongoing income from other sources such as rental income, royalties, business or consulting income, and so on. Typically they have more than a million dollars in investments, and they might be taking out only a small percentage of their assets, well below the sustainable [withdrawal rates](#).

These clients do not worry about having enough money. They already know they have enough; that is not the problem. However, many of them worry about black-swan events. They want to know, "Do I have large enough cushion in my retirement assets to overcome black-swan events?" They want and deserve a better answer from their trusted advisor than just a "Hey! Don't worry about it. You'll be all right."

In my practice, I run a series of stress tests for my green-zone clients. I tell them exactly how much cushion they have in their portfolio for different stress factors. This is the kind of "wow" factor that my clients come to expect from me. Not only it is educational for clients but it also increases their trust and confidence in me. It took me a while to develop and fine-tune this process. If you follow it closely, you might also experience the same kind of "wow" response and resulting client loyalty.

There are many different types of stress events. Here I will cover only the most

important ones:

- Sudden loss of assets
- Need to increase the income taken from the portfolio
- Future inflation higher than historically experienced
- Living longer than financially planned for
- Future equity returns lower than historically experienced
- Future conventional bond yields lower than historically experienced

Our process is simple: For each stress factor, we calculate the maximum allowable number that still allows the client to remain in the green zone. For example, if a client has \$2 million in assets and he needs to withdraw \$30K from his portfolio each year, he can have a sudden loss of half of his assets and still remain in the green zone. Or, he can increase his periodic withdrawals by 100% and still be in the green zone. Or, he can live until age 108 instead of 95 and still be in the green zone.

We define this collection of numbers as the "stress envelope."

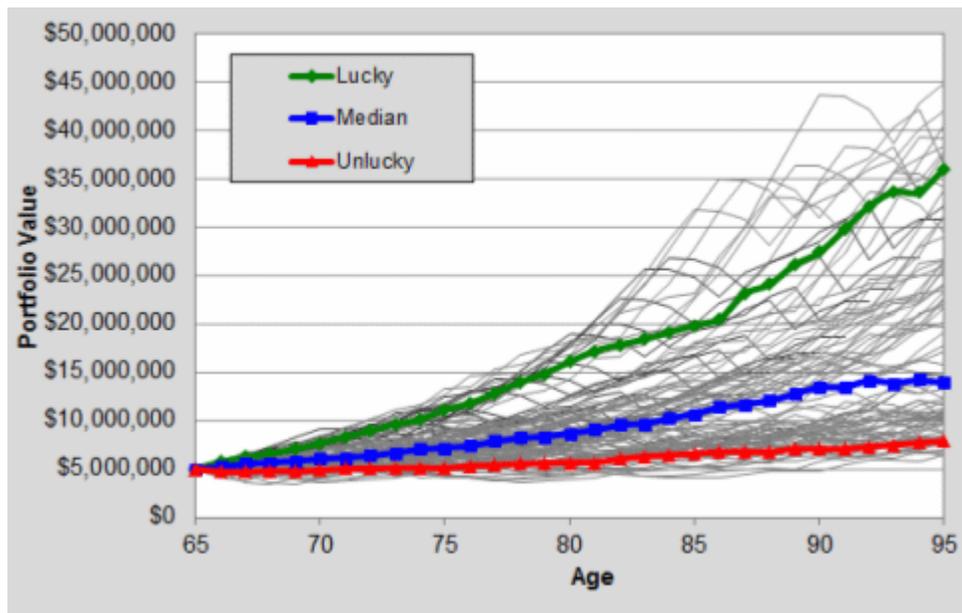
Let's use an example to demonstrate how the process flows: My new clients, Bob and Jane, are both 65 and have just retired. They need \$100,000—indexed to the CPI—annually from their investment assets. Their asset mix is 40% equities and 60% in fixed income, rebalanced annually. We use the S&P 500 index as our equity proxy. As for the bond portfolio, they hold conventional bonds, which pay a 1% premium over and above the historical six-month CD rates. Their total investment assets are \$5 million.

## 'Do we have enough?'

First, I draw an "aftcast chart" to show the portfolio value over the entire retirement time horizon (see Figure 1). Aftcasting reflects the sequence of returns—as well as the volatility of returns—exactly as it happened in history.

Aftcasting, as opposed to forecasting, is a method I developed for analyzing investment outcomes. It includes the actual historical equity performance, inflation, and interest rates, as well as the actual historical sequencing of these data sets. It displays the outcome of all historical asset values of all portfolios since 1900 on the same chart, as if a person had started his plan in each of the years between 1900 and 2000. It gives a bird's-eye view of all outcomes for a specific time horizon. It is not a simulation. It also provides the success and failure statistics with exact historical accuracy, as opposed to man-made simulation models.

### Figure 1: Portfolio Values for Bob and Jane



Source: [Retirementoptimizer.com Inc.](http://Retirementoptimizer.com)

The aftcast shows, based on actual market history, that the portfolio never runs out of money. If Bob and Jane are lucky (top decile), their original \$5 million grows to about \$35 million by age 95. On the other hand, if they are unlucky (bottom decile) it grows to about \$8 million. The median portfolio grows to about \$14 million. Historically, no portfolio runs out of money, and they are definitely in the green zone.

## 'How big is our cushion?'

In order to do the stress test, there is one prerequisite: the client *must* already be in the green zone. If he is in the red or gray zone, the portfolio is already under stress from market, inflation, and longevity risks. It has no room for any additional stress factors. In the above example, we know that Bob and Jane are in the green zone. Thus, we can proceed with our series of stress tests.

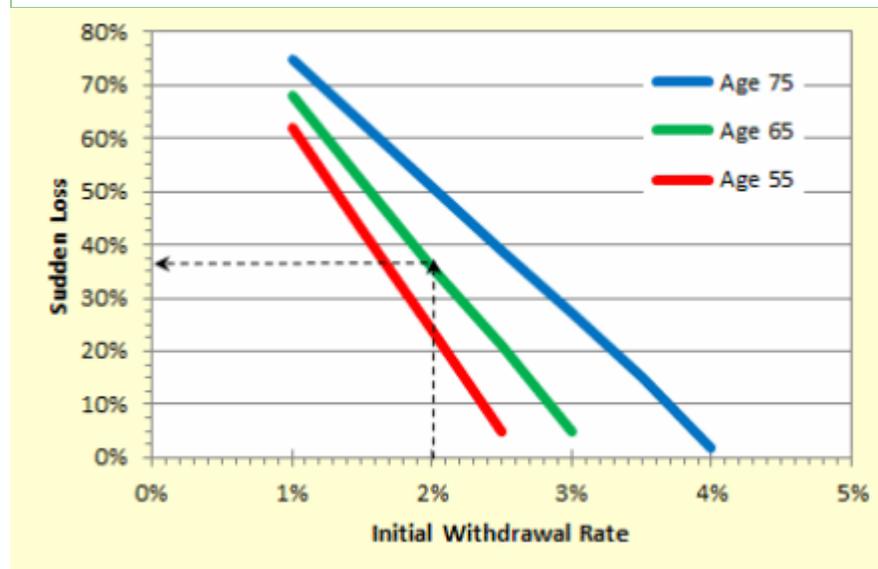
### 1. Sudden loss of assets

What if there was a sudden loss of assets? This can happen as a result of market risk or a behavioral risk—their portfolio loses money, they switch everything to cash and lose any opportunity to recover from that loss.

It can also happen as a result of a catastrophic event. They might need a large chunk of money from their assets as a result of an unforeseen, unbudgeted catastrophic event in their lives. Regardless of the reason, they want to know how much they can lose permanently and still remain in the green zone.

Figure 2 can help you estimate this number.

**Figure 2: How Much Can We Lose Permanently and Still Remain in the Green Zone?**



Source: [Retirementoptimizer.com Inc.](http://Retirementoptimizer.com)

Bob and Jane plan to withdraw \$100,000 annually from their \$5 million portfolio. Therefore, their initial withdrawal rate is 2%. Starting at the horizontal axis at 2%, draw a vertical line all the way to meet the green line (age 65). Then from their intercept, draw a horizontal line, as indicated with the dashed lines.

On the vertical scale, read the maximum loss that they can have and still remain in the green zone. We read 36%, or \$1.8 million. Their assets can go down to \$3.2 million, and, all else being equal, they would still be in the green zone.

Keep in mind that sudden loss means permanent loss. It does not mean portfolio fluctuations. As long as the asset mix is kept the same, Bob and Jane's portfolio will eventually recover from fluctuations.

## 2. Increased income needs

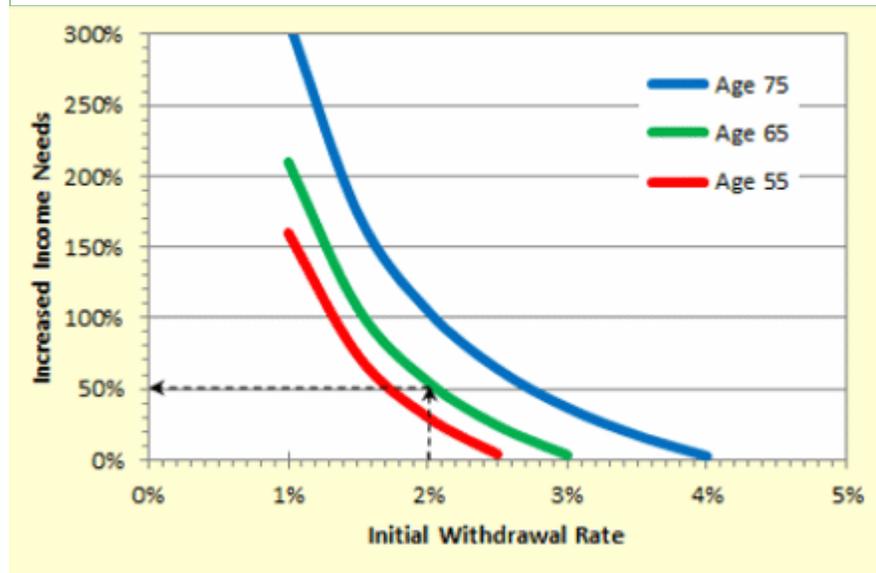
What if they need to increase their withdrawals permanently? This can happen for many reasons, but the usual suspects are home or facility care, permanent disability, the need to take care of children or grandchildren, and so on.

Figure 3 can help you estimate this number. Use the exact same process as above to determine what increased income needs might mean to the portfolio. Starting at the horizontal axis at 2%, draw a vertical line all the way to meet the green line (age 65). Then from their intercept, draw a horizontal line, as indicated with the dashed lines. On the vertical scale, read the increase in income they can have and still remain in the green zone.

We read that Bob and Jane can have a pay increase of about 50% to \$150,000 per

year, indexed to the CPI, and, all else being equal, they would still remain in the green zone.

**Figure 3: How Much More Income Can We Take and Still Remain in the Green Zone?**



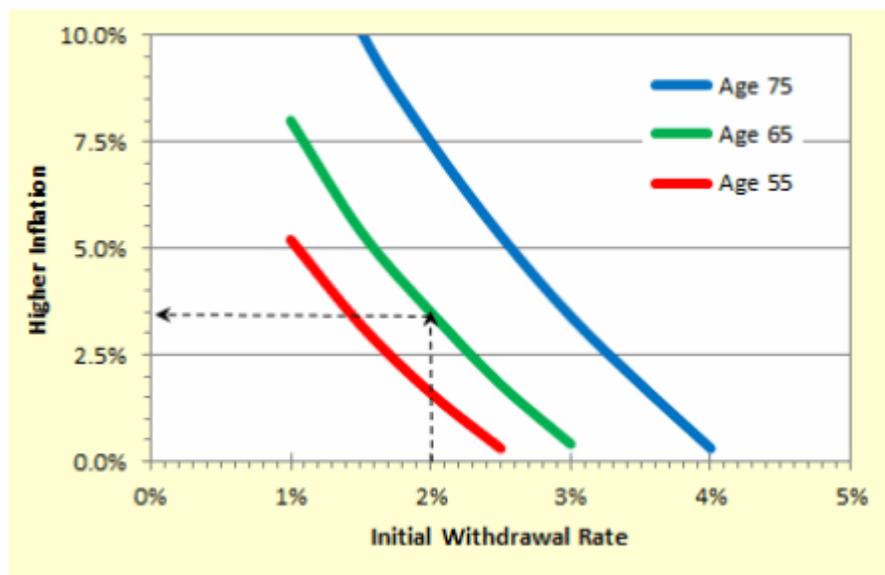
Source: [Retirementoptimizer.com Inc.](http://Retirementoptimizer.com)

### 3. Higher future inflation

In our aftcast, we used the actual inflation for each year since 1900. What if the future inflation turns out to be higher than what we have experienced during the 20th century? If that happens, Bob and Jane would need larger COLA adjustments during their retirement.

Figure 4 can help you figure how much higher the inflation can go without moving Bob and Jane out of the green zone. Following the same process as above, we determine that even if the inflation were 3.5% higher than what we experienced during the last century, all else being equal, Bob and Jane would still remain in the green zone.

**Figure 4: How Much Higher Can Inflation Be for Us to Still Remain in the Green Zone?**



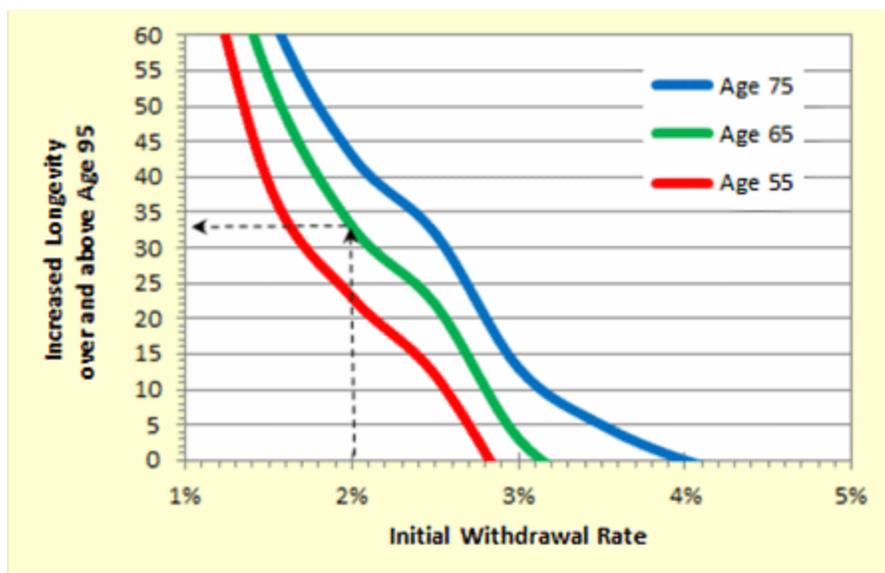
Source: [Retirementoptimizer.com Inc.](http://Retirementoptimizer.com)

#### 4. Living longer

In Bob and Jane's aftcast, we used 95 as the age of death. Mortality tables indicate that there is about a 7% chance that Bob will be still alive at age 95. Jane has about 14% chance of living to age 95. They tell me that both of their parents lived until their late 90s. They are a bit worried about "living too long" and outliving their assets.

Figure 5 can help you estimate how much longer they can live and still reside in the green zone. According to the chart, even if they live 33 years beyond age 95, (i.e. until age 128), all else being the same, Bob and Jane would still remain in the green zone.

**Figure 5: How Much Longer Can We Live and Still Remain in the Green Zone?**



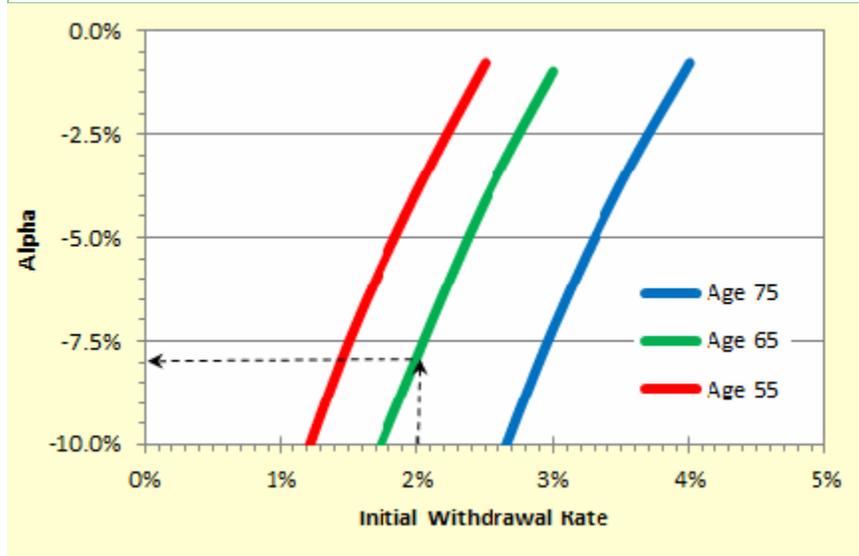
Source: [Retirementoptimizer.com Inc.](http://Retirementoptimizer.com Inc.)

### 5. Low equity returns

What if the future performance of equities turns out to be worse than what we have experienced during the 20th century? In that case, Bob and Jane's assets would not grow as much as we aftcasted in their plan.

Figure 6 can help you estimate how much lower equity returns can go before one moves out of the green zone. According to the chart, even if equities underperformed the index by almost 8% each and every year, all else being equal, Bob and Jane would still remain in the green zone.

**Figure 6: How Much Lower Can Alpha Go and Still Remain in the Green Zone?**



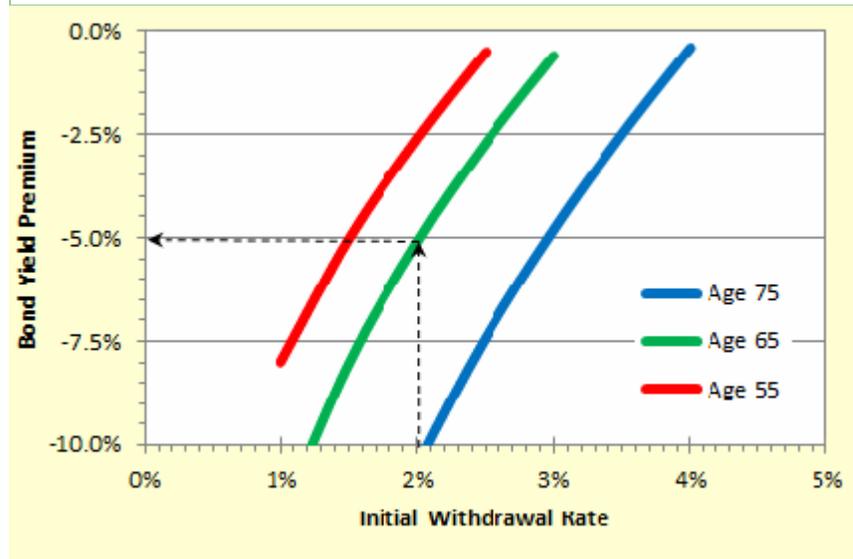
Source: [Retirementoptimizer.com Inc.](http://Retirementoptimizer.com Inc.)

## 6. Lower bond returns

In our aftcast, we used historical six-month CD interest plus 1% as our bond yield. On the current yield curve (at the time of writing), this approximates a bond portfolio with about a six-year term until maturity. What if the future performance of bonds turns out to be worse? What if North American bond markets exhibit a similar pattern to Japanese bond markets of the last 20 years or so?

Figure 7 can help you estimate how much lower the conventional bond yields can go relative to the current yields before our retirees are forced out of the green zone. We read from the chart that even if bonds were to have a 5% lower yield each and every year compared with the last century, all else being equal, Bob and Jane would still remain in the green zone.

**Figure 7: How Much Lower Can Conventional Bond Yields Go and Still Remain in the Green Zone?**



Source: [Retirementoptimizer.com Inc.](http://Retirementoptimizer.com)

## Stress-test results

Now we summarize our findings. We present Bob and Jane with their stress envelope:

- They can lose up to \$1.8 million permanently and still remain in the green zone.
- Total periodic withdrawals can be as large as \$150,000, indexed to the CPI, and still remain in the green zone.
- The future inflation can be up to 3.5% higher than historically experienced and they would still remain in the green zone.
- They can live until age 128 and still remain in the green zone.

- Future equity returns can be up to 8% lower than historically experienced and they would still remain in the green zone.
- Future conventional bond yields can be up to 5% lower and they would still remain in the green zone.

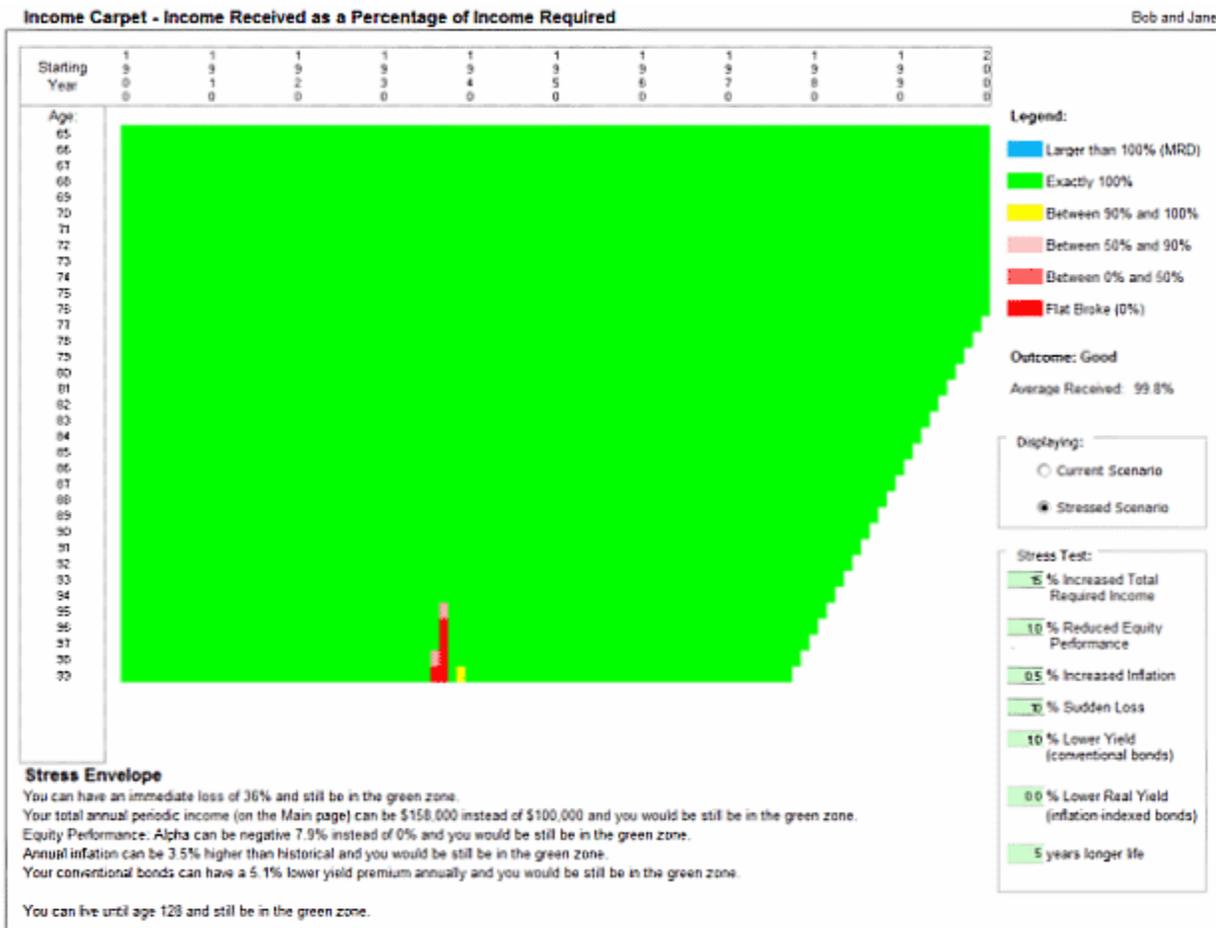
Keep in mind that each one of the numbers indicate the limits of that stress factor alone and not in any combination. If the asset mix is different by more than +10% from this near-optimum asset mix, the stress envelope will be less favorable.

After the presentation, Bob and Jane might decide on the following combined stress envelope:

- A sudden and permanent loss of \$500,000 (10%)
- An increase of their withdrawals by 15% to \$115,000
- An inflation that is 0.5% higher than historically experienced
- Live until age 100 (additional five years)
- Future equity returns 1% lower than historically experienced
- Future conventional bonds yielding 1% lower

Figure 8 depicts the resulting income carpet, including the stress envelope.

### **Figure 8: Income Carpet and Stress Envelope for Bob and Jane**



Source: [Retirementoptimizer.com](http://Retirementoptimizer.com)

## Conclusion

**Savvy Social Security Planning for Boomers**

When preparing a retirement plan, use the client's expected budget to generate a base case without padding a "cushion" into the aftcast. After that, if it turns out that your client is in the green zone, add the combined stress envelope into the plan, as we did in the example.

Bob and Jane were happy to see that their outcome is "good" even under their choice of various stress factors. They have a big cushion, and the numbers attest to that. They are impressed with the logic, depth, and coverage of your analysis. Now you look a lot more credible than if you were just to tell them: "Hey! Don't worry about it. You'll be all right."

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