Important Disclosures

Current performance may be lower or higher than return data quoted herein. For more current information, including month-end performance, please call 877-474-5016 or visit https://retire.massmutual.com. The investment return and principal value of an investment will fluctuate; so an investor's shares, units, or portions, when redeemed, may be worth more or less than their original cost. Investment portfolio statistics change over time. The investment is not FDIC-insured, may lose value and is not guaranteed by a bank or other financial institution.

Some plan investments may be made available through an unaffiliated group contract issued to your plan by the Massachusetts Mutual Life Insurance Company ("MassMutual"). If that is the case, those plan investments 1) may be in a separate investment account of MassMutual that purchases shares/units of one or more underlying investments, or 2) may be invested directly in the investment via a separate arrangement between your plan and a trust company.

Pre-inception Returns

For newer share classes, Morningstar may provide adjusted historical returns based on the oldest surviving share class of a fund with at least three years of performance history. This enables investors to compare the completion history of an investment. Morningstar calculates these returns by adjusting the initial share class performance for any difference in fee structure. However, if using the expenses of the newer share class rather than the expenses of the older share class would result in better performance, then pre-inception performance represents that of the older share class rather than the newer one. The fees and expenses are referenced in the report’s Operations section. Adjusted historical returns are not actual returns. Calculation methodologies utilized by Morningstar may differ from those applied by other entities, including the investment itself.

Performance

These results do not reflect performance without adjusting for sales charges or the effects of taxation. They are adjusted, however, to reflect all actual ongoing fund expenses and assume reinvestment of dividends and capital gains. Returns are compared to an appropriate benchmark peer group to help investors evaluate performance. The investment’s performance is generally compared with that of an index. The index is an unmanaged portfolio of specified securities and does not reflect any initial or ongoing expenses nor can it be invested in directly. An investment’s portfolio may differ significantly from the securities in the index. The Index may not be the same as the comparable index noted in the investment’s prospectus (if applicable).

Gross Expense Ratio/Net Expense Ratio

Expense ratios reflect the percentage of the investment’s assets paid for operating expenses and management fees. In contrast to net expense ratios, gross expense ratios do not reflect any fee waivers in effect during the time period, which are typically disclosed alongside the expense ratios themselves. Net expense ratios reflect the fees actually borne by investors during the period they are in effect. Investment expense information (including waiver information) is pulled from an investment’s most recent prospectus, if applicable. If an additional separate investment account fee applies, it is added to the gross and not expressed in the prospectus or other source of the expense information and factored into the performance of the separate investment account.

Utilized Plan Fund

If this is a unitized plan fund, it will invest in shares of the referenced underlying investment. Depending on the level of administrative services ("ASF") generated from the underlying investment and MassMutual’s target ASF for the plan, on a periodic basis MassMutual will make adjustments to the utilized plan fund’s expense to cause each utilized plan fund to produce ASF equal to the target ASF. If the ASF MassMutual receives from the underlying investment is less than MassMutual’s target ASF, MassMutual will redeem shares or units from the underlying investment such that the amount of the revenue received from the underlying investment for administrative services equals MassMutual’s target revenue. As a result of this process, the reported performance and expenses of the utilized plan fund is based on but not identical to the performance and expenses reported for the underlying investment.

Maximum Sales Charge/12b-1 Fee/Redemption Fee

Maximum Sales Charges and Redemption Fees are waived for MassMutual retirement plan participants. In addition, 12b-1 Fees are a component of the Net and Gross Expense Ratio; they are not in addition to the overall expense ratio.

Morningstar Proprietary Statistics

Some Morningstar proprietary calculations, including the Morningstar Rating, Morningstar Return, and Morningstar Risk may be calculated based on pre-inception returns. Please see the pre-inception returns disclosure (above) for more details. For definitions of these statistics including credit quality, please visit www.MassMutual.com/73/mstrdisclsure.pdf.

Morningstar Rating

The Morningstar Rating is an analyst assessment of a fund's performance based on risk-adjusted returns for each of the fund's star categories (Highest); if it falls in the next 22.5% it receives 4 stars (Above Average); a place in the middle 35% earns 3 stars (Average); below that in 22.5%, receive 2 stars (Below Average); and the bottom 10% get only 1 star (Lowest). The Overall Morningstar Rating is a weighted average of the available three-, five-, and 10-year ratings.

Investment Risk

Money market investments are not insured or guaranteed by the Federal Deposit Insurance Corporation or any other government agency. Although these investments seek to preserve the value of your investment at $1.00 per share, they cannot guarantee that it will do so. The fund’s sponsor has no legal obligation to provide financial support to a money market fund; and you should not expect that the sponsor will provide financial support to the fund at any time. You could lose money by investing in a money market option.

Risks of investing in debt securities investments include the risk that a bond issuer will default by failing to repay principal and interest in a timely manner (credit risk) and/or the risk that the value of the security will decline when interest rates increase (interest rate risk). Risks of investing in inflation-protected bond investments include credit risk and interest rate risk. Neither the bond investment nor its yield is guaranteed by the U.S. government.

High-yield bond investments are generally subject to greater market fluctuations and risk of loss of income and principal than lower-yielding debt securities investments. Investments that track a benchmark index are professionally managed. However, the benchmark index itself is unmanaged and does not incur fees or expenses and cannot be purchased directly.

Investments in value stocks may remain undervalued for extended periods of time, and the market may not recognize the intrinsic value of these securities. Investments in growth stocks may experience price volatility due to their sensitivity to market fluctuations and dependence on future earnings expectations. Investments in companies with small or mid market capitalization ("small caps" or "mid caps") may be subject to special risks given their characteristic narrow markets, limited financial resources, and less liquid stocks, all of which may cause price volatility.

International/global investing can involve special risks, such as political changes and/or currency fluctuations. These risks are heightened in emerging markets.

A significant percentage of the underlying investments in aggressive asset allocation portfolio investments have a higher than average risk exposure. Investors should consider their risk tolerance carefully before choosing such a strategy. An investment with multiple underlying investments (which may be available in MRA Retirement) by JP Morgan and any other offered proprietary or non-proprietary asset-allocation, lifestyle (risk based), lifecycle (target date) or custom blended investments may be subject to the expenses of those underlying investments in addition to those of the investment itself.

Investments may reside in the specialty category due to 1) available investment flexibility (it precludes classification in standard asset categories and/or) investment concentration in a limited group of securities or industry sectors. Investments in this category may be more volatile than less-flexible and/or less-concentrated investments and may be appropriate as only a minor component in an investor's overall portfolio.

Participants with a large ownership interest in a company or employer stock investment may have the potential to manipulate the value of units of this investment option through their trading practices. As a result, special transfer restrictions may apply. This type of investment option presents a higher degree of risk than diversified investment options under the plan because it invests in the securities of a single company. Investments that invest more of their assets in a single issuer or industry sector (such as company stock or sector investments) involve additional risks, including unit price fluctuations, because of the increased concentration of assets.

A participant will be prohibited from transferring into most mutual funds and similar investments if they have transferred into and out of the same investment within the previous 60 days. Certain stable value, guaranteed interest, fixed income and other investments are not subject to this rule. This rule does not prohibit participants from transferring out of any investment at any time.

Target Date (lifecycle)

Generally these investment options are designed to be held beyond the presumed retirement date to offer a continuing investment option for the investor in retirement. The year in the investment option name reflects the approximate year an investor in the option would plan to retire and likely would stop making new contributions to the investment option. However, investors may choose a date other than their presumed retirement date to be more conservative or aggressive depending on their own risk tolerance. They are designed for participants who plan to withdraw the value of their accounts gradually after retirement. Each of these options follows its own asset allocation path ("glide path") to progressively reduce its equity exposure and become more conservative over time. Options may not reach their most conservative allocation until after their target date. Others may reach their most conservative allocation in their target date year. Investors should consider their own personal risk tolerance, circumstances and financial situation. These options should not be selected solely on a single factor such as age or retirement date. Please consult the prospectus (if applicable) pertaining to the options to determine if their glide path is consistent with your long-term financial plan. Target retirement date investment options’ stated asset allocation may be subject to change. Investments in these options are not guaranteed and you may experience losses, including losses near, at, or after the target date. Additionally, there is no guarantee that the options will provide adequate income at and through retirement.

Investors should consider an investment’s objectives, risks, charges and expenses carefully before investing. For this and other information, see a fact sheet (investment profile) or the prospectus, if applicable. You may obtain a prospectus or fact sheet from your plan sponsor or visiting www.massmutual.com. Read it carefully before investing.
Investment Objective & Strategy
The fund invests at least 80% of its assets (net assets plus any borrowings for investment purposes) in large capitalization companies, which are companies having a market capitalization in excess of $4 billion at the time of purchase. The Subadvisor invests substantially all of the fund’s investable assets in domestic securities. However, the fund is permitted to invest up to 20% of its net assets in foreign securities, which are generally securities issued by companies organized outside the U.S. or that trade primarily in non-U.S. securities markets.

Category Description: Large Growth
Large-growth portfolios invest primarily in big U.S. companies that are projected to grow faster than other large-cap stocks. Stocks in the top 70% of the capitalization of the U.S. equity market are defined as large cap. Growth is defined based on fast growth (high growth rates for earnings, sales, book value, and cash flow) and high valuations (high price ratios and low dividend yields). Most of these portfolios focus on companies in rapidly expanding industries.

Volatility Analysis
In the past, this investment has shown a wide range of price fluctuations relative to other investments. This investment may experience significant price increases in favorable markets or undergo large price declines in adverse markets. Some of this risk may be offset by owning other investments that follow different investment strategies.

Performance Disclosure: The performance data given represents past performance and does not guarantee future results. The investment return and principal value of an investment will fluctuate; so an investor’s shares/units, when redeemed, may be worth more or less than their original cost. Current performance may be lower or higher than return data quoted herein.

Portfolio Analysis as of 11-30-19
Composition as of 11-30-19

<table>
<thead>
<tr>
<th>% Assets</th>
<th>U.S. Stocks</th>
<th>Non-U.S. Stocks</th>
<th>Bonds</th>
<th>Cash</th>
<th>Other</th>
</tr>
</thead>
<tbody>
<tr>
<td>92.8</td>
<td>7.0</td>
<td>6.7</td>
<td>0.0</td>
<td>0.0</td>
<td>0.4</td>
</tr>
</tbody>
</table>

Top 10 Holdings as of 11-30-19

<table>
<thead>
<tr>
<th>% Assets</th>
<th>Name of Issuer</th>
</tr>
</thead>
<tbody>
<tr>
<td>7.0</td>
<td>Microsoft Corp</td>
</tr>
<tr>
<td>6.34</td>
<td>Amazon.com Inc</td>
</tr>
<tr>
<td>5.27</td>
<td>Apple Inc</td>
</tr>
<tr>
<td>4.75</td>
<td>Visa Inc Class A</td>
</tr>
<tr>
<td>4.67</td>
<td>Facebook Inc A</td>
</tr>
<tr>
<td>3.94</td>
<td>Salesforce.com Inc</td>
</tr>
<tr>
<td>3.44</td>
<td>Mastercard Inc A</td>
</tr>
<tr>
<td>3.12</td>
<td>Adobe Inc</td>
</tr>
<tr>
<td>2.86</td>
<td>Alphabet Inc Class C</td>
</tr>
<tr>
<td>2.82</td>
<td>Alphabet Inc A</td>
</tr>
</tbody>
</table>

Total Number of Stock Holdings: 48
Total Number of Bond Holdings: 0
Annual Turnover Ratio %: 54
Total Fund Assets ($mil): 12,205.7

Principal Risks as of 11-30-19
Foreign Securities, Loss of Money, Not FDIC Insured, Capitalization, Growth Investing, Market/Market Volatility, Equity Securities, Shareholder Activity, Management