Semi-Annual Treasury Analysis and Liquidity Status Report

Prepared for: Finance and Administration Committee - Period ending December 31, 2016

CalPERS

Public Employees' Retirement Fund (PERF)

The PERF provides retirement benefits to the State of California, schools and other California public agency employees. The PERF benefits are funded by member contributions, employer contributions, and by investment earnings. The analysis included in this report is for the time period of July 1, 2016 through December 31, 2016. Changes in investment asset allocation and investment strategies can significantly impact data reported from period to period.

Liquidity Coverage Ratio Analysis

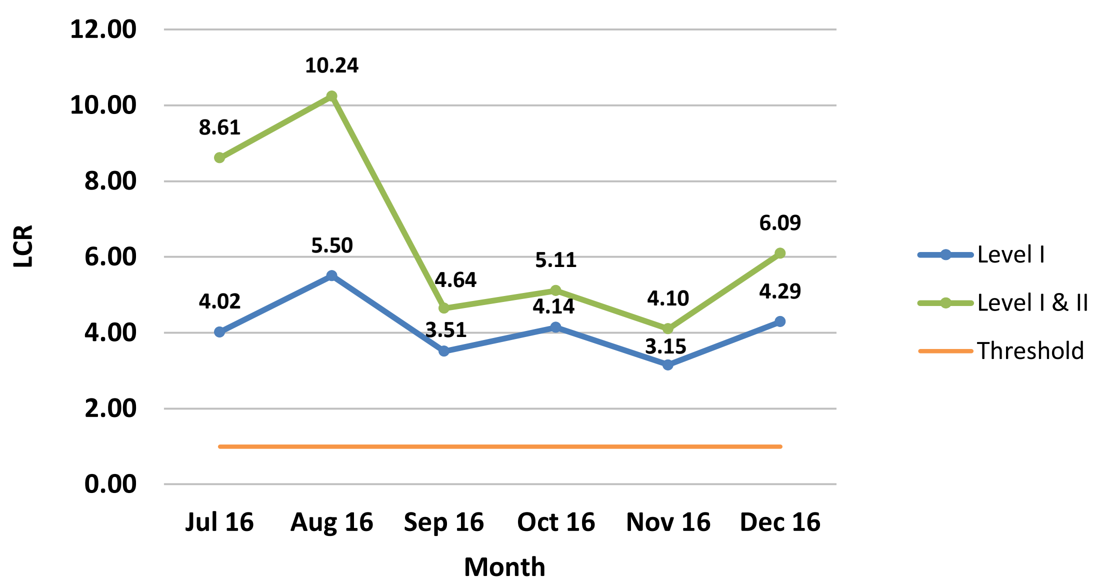
$$\text{Liquidity Coverage Ratios (LCR)} = \frac{\text{cash + assets convertible to cash + incoming cash sources}}{\text{outgoing cash uses + contingent cash uses}}$$

Funding Sources and Graph Details

Level I: Cash and cash equivalents
Level II: Borrowed liquidity held in cash
Level III: Sale of public assets
Threshold: Indicates the Fund's ability to cover 100% of monthly obligations.

Normal Environment - 30-Day Liquidity Coverage Ratios

The 30-day LCR included investment and non-investment available cash flows.

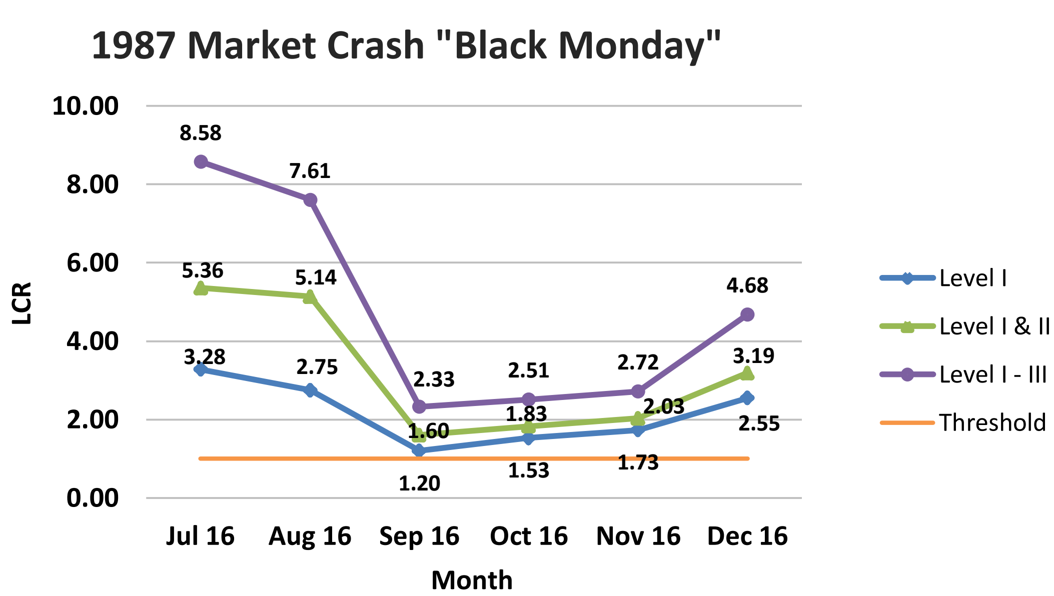


Level I: Level I LCR exceeded the threshold in July through December. August LCR increased due to a transition from Global Equity to Liquidity. In September, the Investment Committee approved the increase of Liquidity asset allocation from 1% (+/- 3%) to 4% (+3/-6%). The September LCR decreased due to an asset transition from Liquidity to Inflation. The December LCR increased due to quarterly State contributions and an increase in investment sources from Private Equity.

Level I & II: Since Level I LCR remained above the threshold, it was not necessary to utilize Level II assets. September LCR decreased due to a decrease in security lending activity.

Stressed Environments - 30-Day Liquidity Coverage Ratios

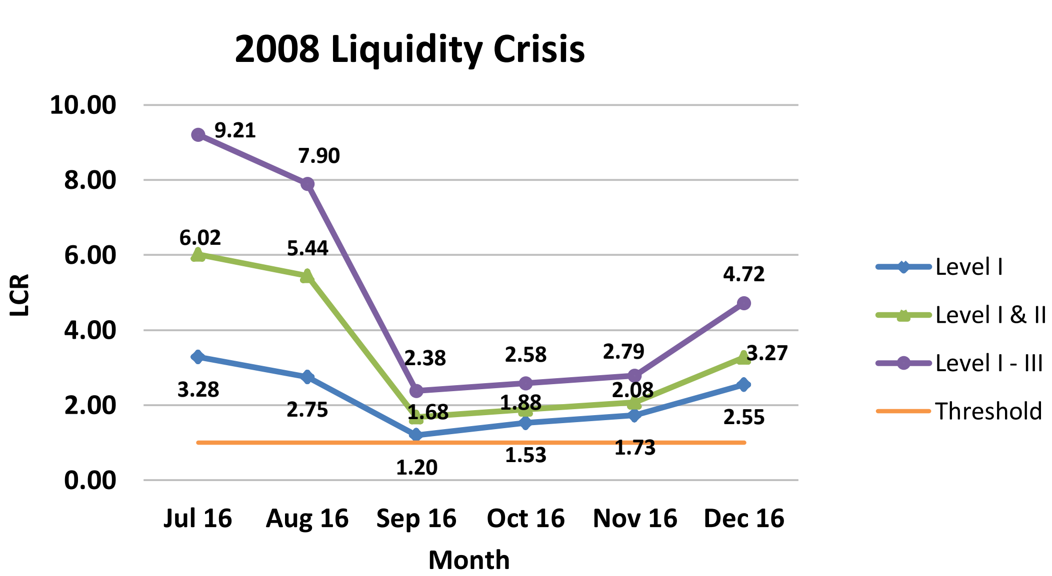
Stressed environment LCR scenarios were calculated assuming starting assets were stressed by the percentages actually experienced over 5 days in the 1987 market crash and 30 days during September 2008. Starting assets were further reduced by a transactional liquidity % equal to the estimated % of the assets that could have been liquidated during the 30-day period. Under the stressed scenarios, asset class sources were reduced to zero and uses were doubled.



Level I: In July through December, Level I LCRs were adequate had a stressed event similar to "Black Monday" occurred.

Level I & II: CalPERS would not have needed to utilize Level II assets.

Level I – III: CalPERS would not have needed to utilize Level III assets.



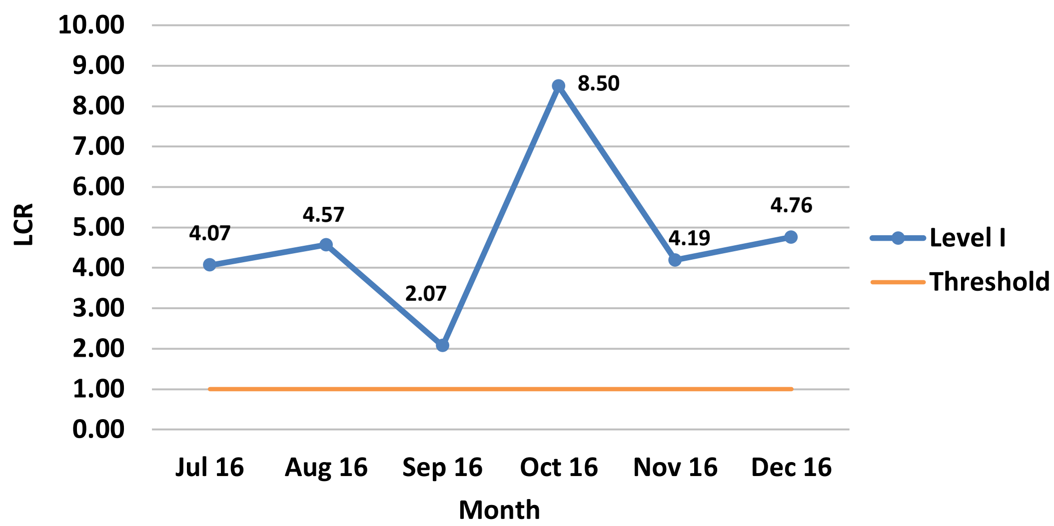
Level I: In July through December, Level I LCRs were adequate had a stressed event similar to the 2008 Liquidity Crisis occurred.

Level I & II: CalPERS would not have needed to utilize Level II assets.

Level I – III: CalPERS would not have needed to utilize Level III assets.

Crisis Environment - 10-Day Liquidity Coverage Ratio

The 10-day LCR utilized only the available cash balance ten days prior to the payment date. The calculation assumed a five business day market lockdown as experienced on September 11th, 2001.



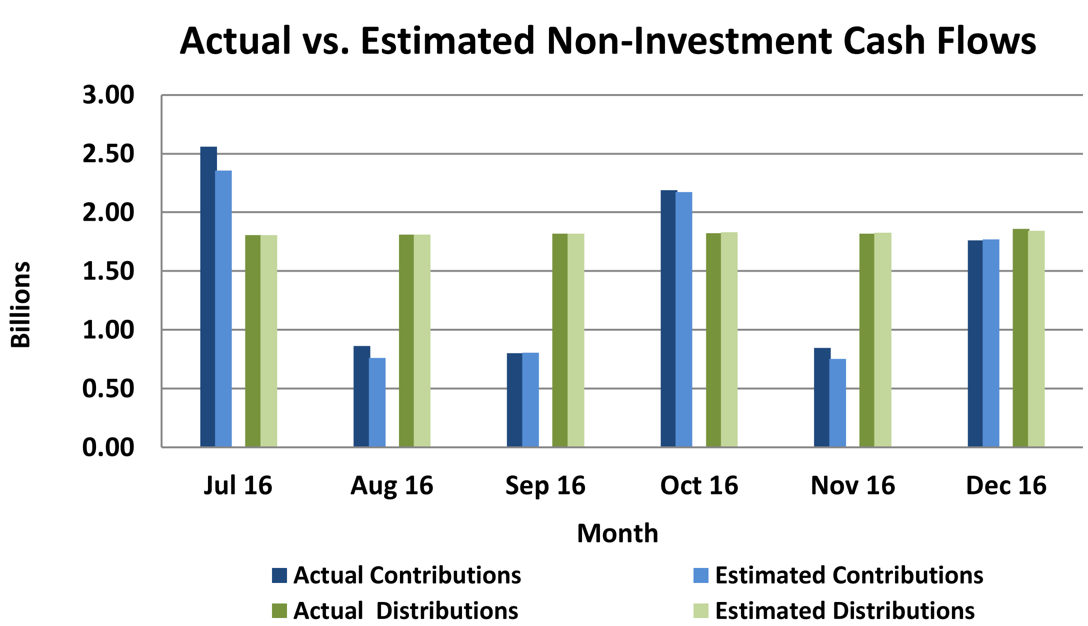
Level I: The PERF had sufficient cash to cover obligations ten days prior to the funding of member benefits in July through December. This indicated Level I was adequate had a crisis event occurred. October's LCR increased because of an allocation shift from the Global Equity to Liquidity. In a crisis environment, CalPERS would not have access to Level II and Level III assets because it is assumed there was a five business day market lockdown similar to September 11th, 2001.

Overall PERF Liquidity Health

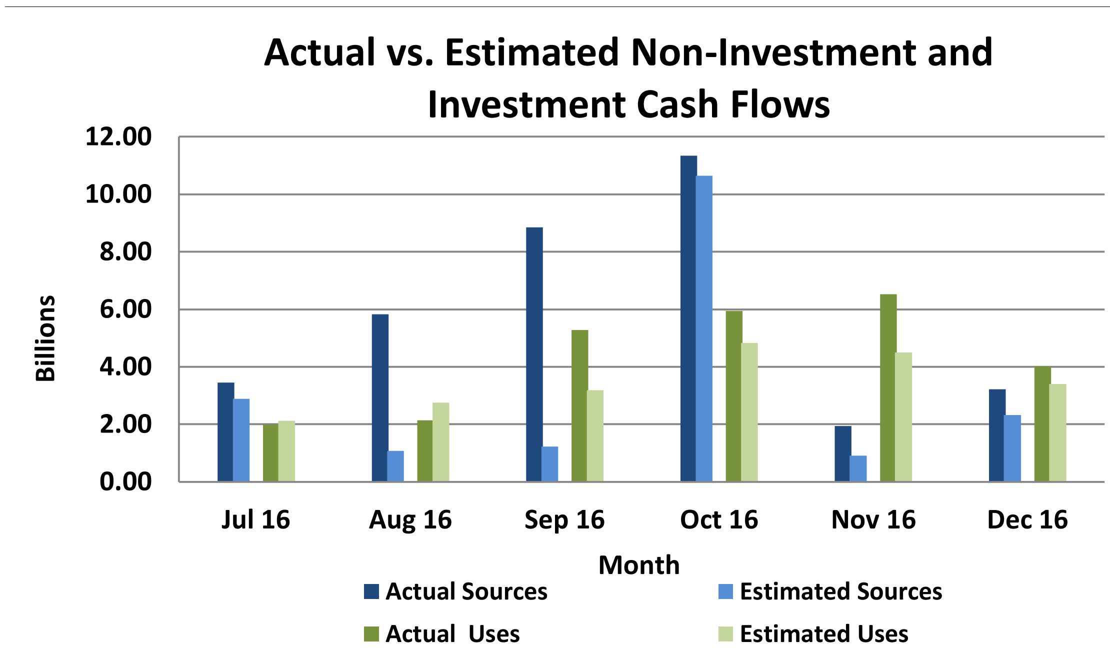
Coverage Ratio Analysis:

- ✓ CalPERS was able to make payments for benefits, operating expenses and projected investments regardless of market conditions.
- ✓ PERF's liquidity remained above the threshold in the normal environment.
- ✓ PERF's liquidity was adequate in stressed and crisis environments.
- ✓ Staff will continue to monitor PERF's liquidity health using LCRs.

PERF Cash Flow Forecasting



In July, employers were given the opportunity to participate in the Unfunded Accrued Liability prepayment option. This resulted in greater actuals than forecasted contributions. August and November's actual contributions from state and public agencies exceeded forecasted amounts. September, October and December actual vs. estimated contributions and distributions were in the 90th percentile.



Cash flow forecasting for total fund cash activities (both non-investment and investment) can be volatile. Components that drove forecast volatility included, but were not limited to: private equity activity, real estate and investment expenses. August and September experienced high volatility in investment sources due to asset allocation shifts. In September through December, the uses variances were due to greater contributions to private equity and real estate investments.

Treasury Analysis and Liquidity Status Report

Prepared for: Finance and Administration Committee - Period ending December 31, 2016

Legislators' Retirement Fund (LRF)

The LRF provides retirement benefits to California Legislators elected to office before November 7, 1990, and to constitutional, legislative, and statutory officers elected or appointed prior to January 1, 2013. The Fund is closed to new participants. The number of LRF members has been declining in the last decade as eligible incumbent Legislators leave office and are replaced by those ineligible to participate in the LRF. Actuarially determined contributions will continue to be made by the State of California to supplement the existing assets until all benefit obligations have been fulfilled.

Liquidity Coverage Ratio Analysis

$$\text{Liquidity Coverage Ratios (LCR)} = \frac{\text{cash + assets convertible to cash + incoming cash sources}}{\text{outgoing cash uses + contingent cash uses}}$$

Funding Sources and Graph Details

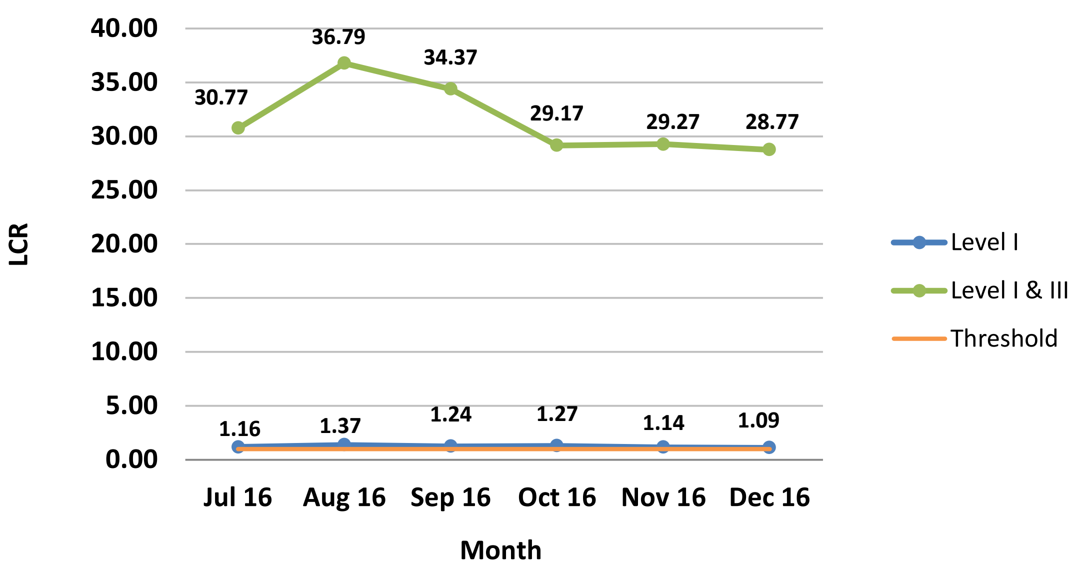
Level I: Cash and cash equivalents

Level III: Sale of public assets

Threshold: Indicates the Fund's ability to cover 100% of monthly obligations

Normal Environment - 30-Day Liquidity Coverage Ratios

The 30-day LCR included investment and non-investment available cash flows.

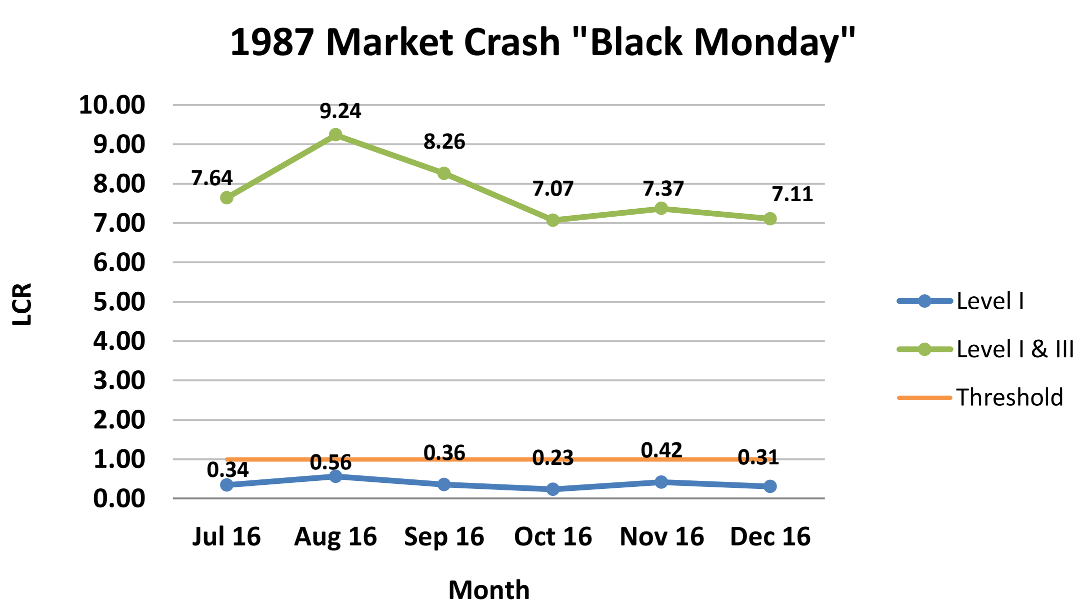


Level I: Level I LCR remained above the threshold in July through December. The Fund does not maintain any private market investments therefore Level I LCRs were consistently at or just above 1.0.

Level I & III: Since Level I LCR remained above the threshold, it was not necessary to utilize Level III assets. October through December's decrease was due to an increase in benefit payments.

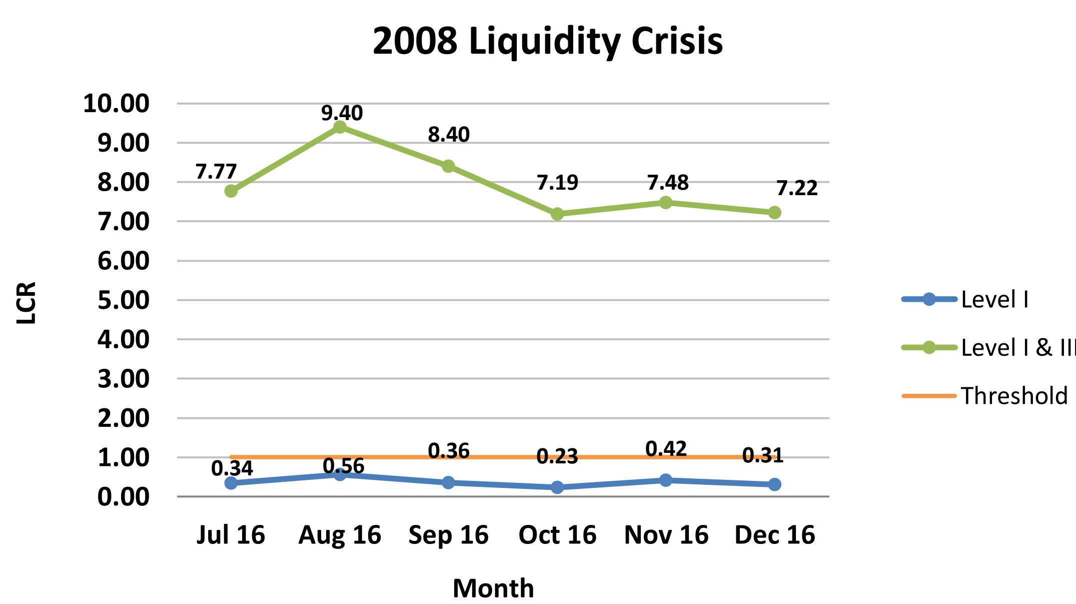
Stressed Environments - 30-Day Liquidity Coverage Ratios

Stressed environment LCR scenarios were calculated assuming starting assets were stressed by the percentages actually experienced over 5 days in the 1987 market crash and 30 days during September 2008. Starting assets were further reduced by a transactional liquidity % equal to the estimated % of the assets that could have been liquidated during the 30-day period. Under the stressed scenarios, asset class sources were reduced to zero.



Level I: Level I assets would have been inadequate had a stressed event similar to "Black Monday" occurred. It is projected that the LCRs will consistently fall below the threshold since this scenario assumes no investment inflows. This is a closed fund and relies on the planned sale of assets to pay member benefits.

Level I & III: Level I and Level III assets were adequate had a stressed event similar to "Black Monday" occurred. October through December's decrease was due to an increase in benefit payments.

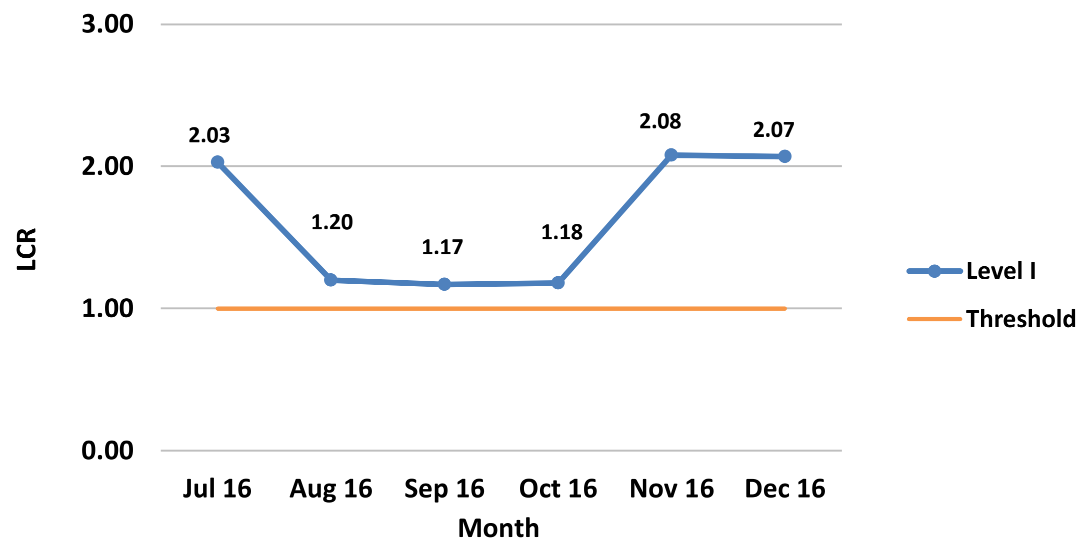


Level I: Level I assets would have been inadequate had a stressed event similar to the 2008 Liquidity Crisis occurred. It is projected that the LCRs will consistently fall below the threshold since this scenario assumes no investment inflows. This is a closed fund and relies on the planned sale of assets to pay member benefits.

Level I & III: Level I and Level III assets were adequate had a stressed event similar to the 2008 Liquidity Crisis occurred. October through December's decrease was due to an increase in benefit payments.

Crisis Environment - 10-Day Liquidity Coverage Ratios

The 10-day LCRs utilized only the available cash balance ten days prior to the payment date. The calculation assumed a five business day market lockdown as experienced on September 11th, 2001.



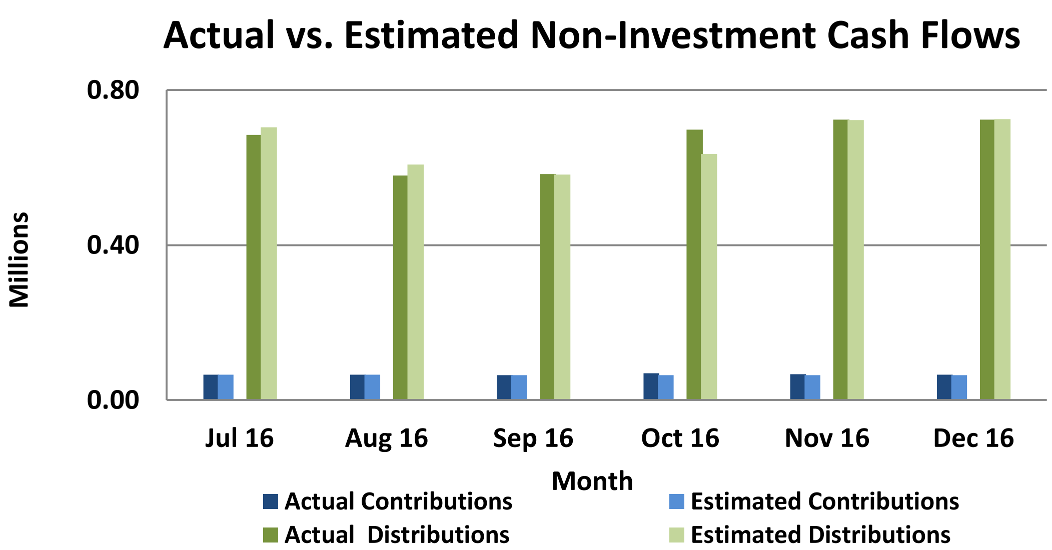
Level I: The LRF had sufficient cash to cover obligations ten days prior to the payment date. This indicated Level I would have been adequate had a crisis event occurred. Fluctuations in coverage ratios were due to timing of benefit payments. In a crisis environment, CalPERS would not have access to Level III assets since it is assumed there was a five business day market lockdown similar to September 11th, 2001.

Overall LRF Liquidity Health

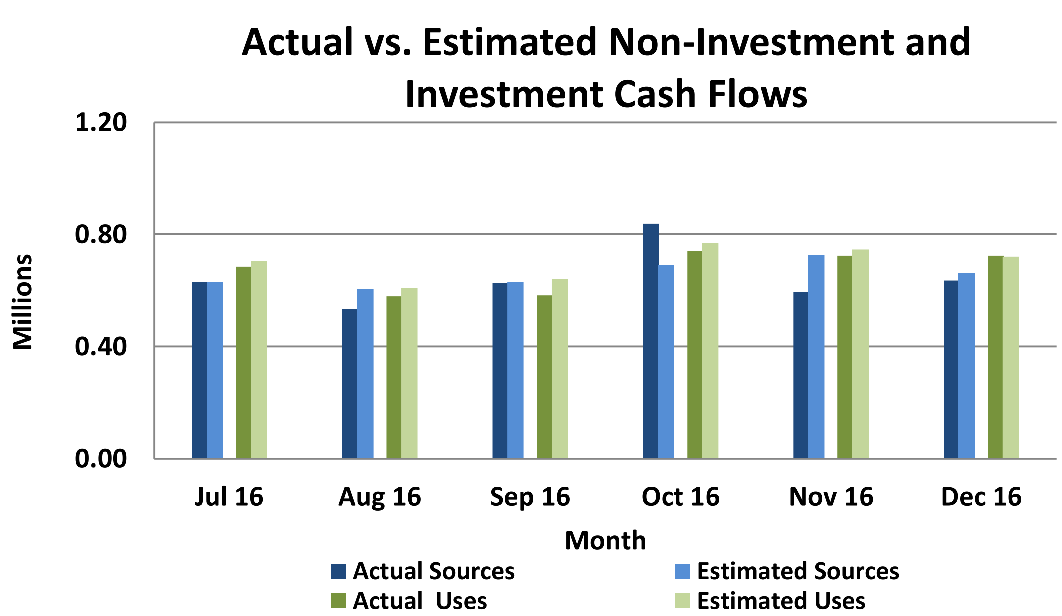
Coverage Ratio Analysis:

- ✓ LRF was able to make payments for benefits and operating expenses regardless of market conditions.
- ✓ LRF's liquidity remained above the threshold in the normal and crisis environment.
- ✓ LRF would have needed to sell public assets to meet monthly obligations in both stressed environments.
- ✓ Staff will continue to monitor LRF's liquidity heath using LCRs.

LRF Cash Flow Forecasting



Cash flow forecasting accuracy was in the 90th percentile for all months except October. October's distribution variance was due to an increase in benefit payments for the month.



Cash flow forecasting for total fund cash activities (both non-investment and investment) are consistent month to month. October and November's source variance was due to timing of investment cash needed to cover benefit payments.

Treasury Analysis and Liquidity Status Report

Prepared for: Finance and Administration Committee - Period ending December 31, 2016

CalPERS

Judges' Retirement Fund I (JRF I)

The JRF I provides retirement benefits to California Supreme and Appellate Court Justices and Superior Court Judges appointed or elected before November 9, 1994. The State of California does not pre-fund the benefits for this fund. The benefits are funded on a pay-as-you-go basis. The Fund maintains a reserve equal to two months of member benefit payments and obligations.

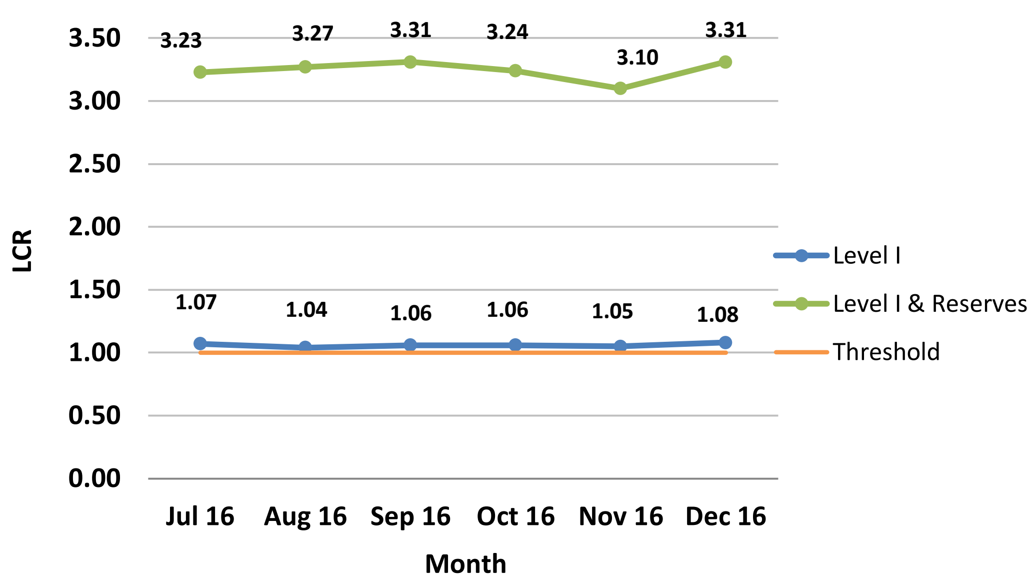
Liquidity Coverage Ratio Analysis

$$\text{Liquidity Coverage Ratios (LCR)} = \frac{\text{cash + assets convertible to cash + incoming cash sources}}{\text{outgoing cash uses + contingent cash uses}}$$

Funding Sources and Graph Details
Level I: Cash and cash equivalents
Reserves: Cash and cash equivalents
Threshold: Indicates the Fund's ability to cover 100% of monthly obligations

Normal Environment - 30-Day Liquidity Coverage Ratios

The 30-day LCR included investment and non-investment available cash flows.

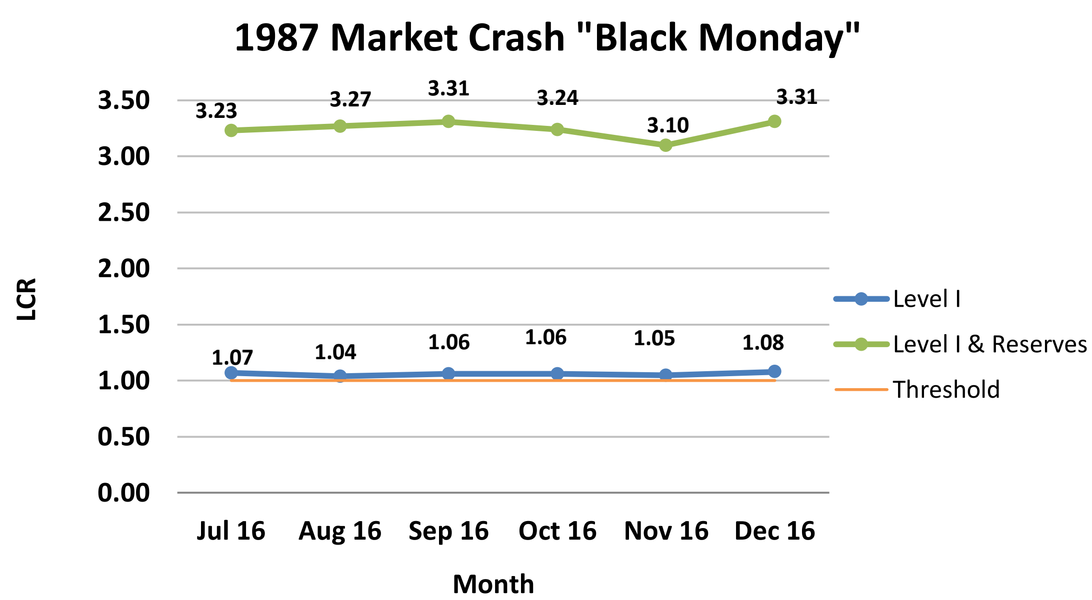


Level I: Level I LCRs remained above the threshold in July through December. The Fund maintained adequate inflows to cover monthly liabilities.

Reserves: Since Level I LCRs remained above the threshold, it was not necessary to utilize Reserves.

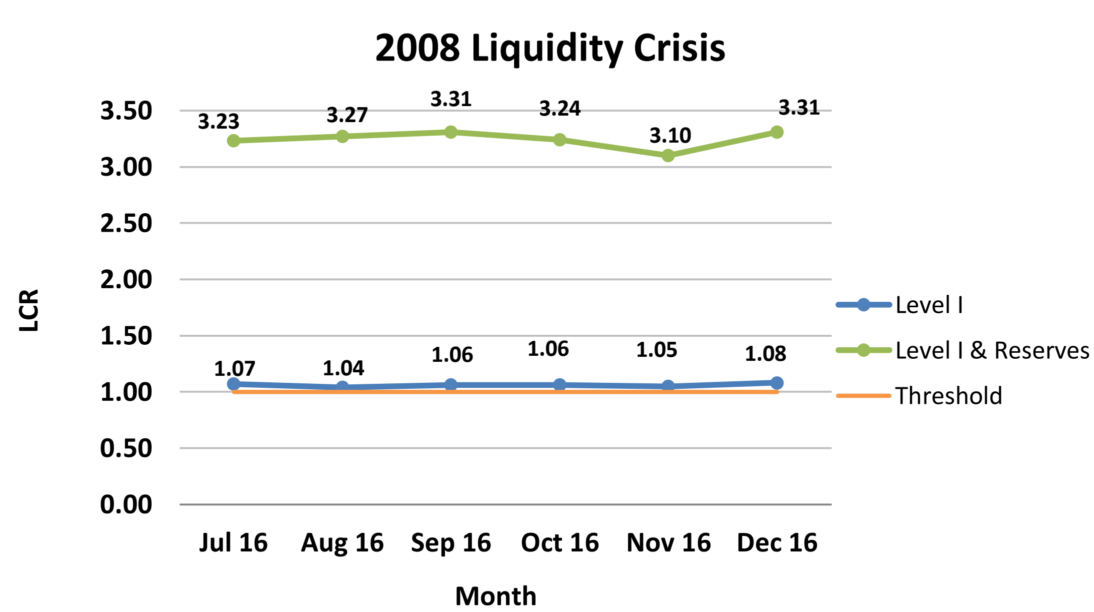
Stressed Environments - 30-Day Liquidity Coverage Ratios

Stressed environment LCR scenarios were calculated assuming starting assets were stressed by the percentages actually experienced over 5 days in the 1987 market crash and 30 days during September 2008. Starting assets were further reduced by a transactional liquidity % equal to the estimated % of the assets that could have been liquidated during the 30-day period. Since 100% of Reserves for JRS I were held in cash and cash equivalents, stress factors did not apply and the LCRs remained the same as the normal environment.



Level I: July through December Level I LCRs were adequate had a stressed event similar to "Black Monday" occurred.

Reserves: Level I assets and Reserves were adequate had a stressed event similar to "Black Monday" occurred.



Level I: July through December Level I LCRs were adequate had a stressed event similar to the 2008 Liquidity Crisis occurred.

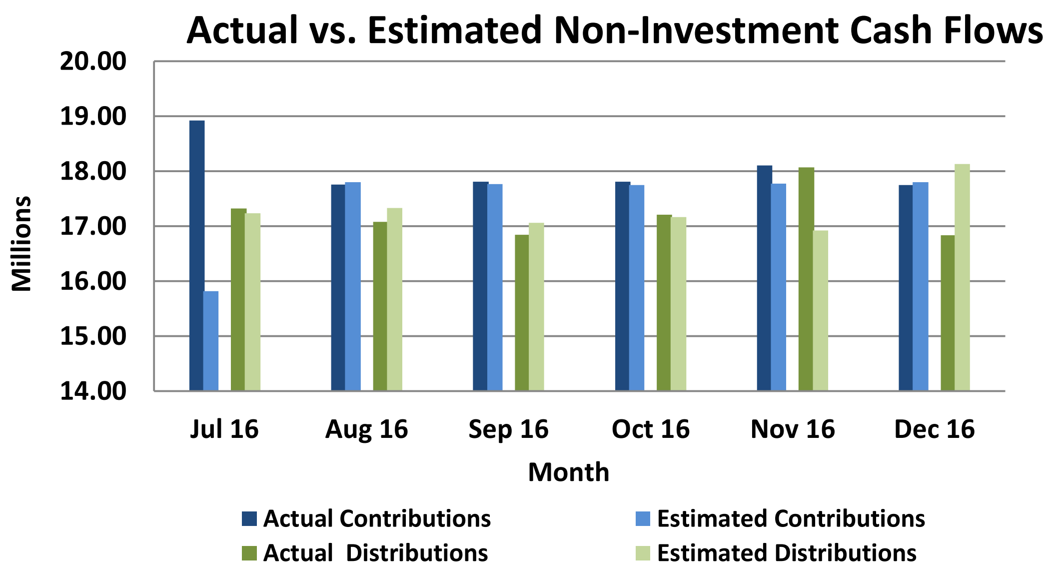
Reserves: Level I and Reserves were adequate had a stressed event similar to the 2008 Liquidity Crisis occurred.

Overall JRF I Liquidity Health

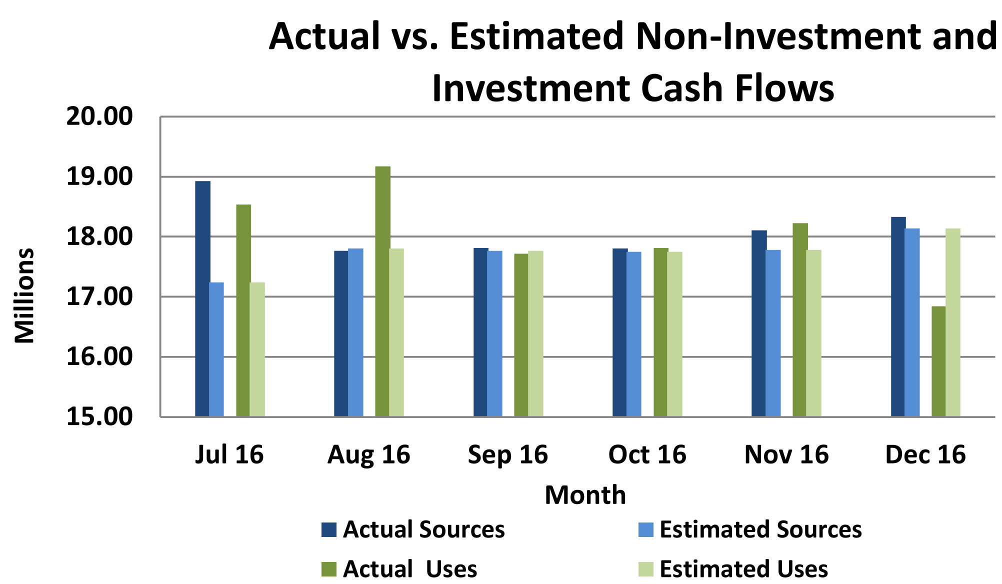
Based Coverage Ratio Analysis:

- ✓ JRF I was able to make payments for benefits and operating expenses regardless of market conditions.
- ✓ JRF I's liquidity remained above the threshold in the normal environment.
- ✓ JRF I's liquidity was adequate in stressed environments.
- ✓ Staff will continue to monitor JRF I's liquidity health using LCRs.

JRF I Cash Flow Forecasting



July's contribution variance was due to the 2016 Budget Act that increased contributions from the General Fund to cover monthly obligations. August through October cash flow forecasting accuracy was in the 90th percentile. November and December's distribution variance was due to greater benefit payments paid out for the month.



July's contribution variance was due to the 2016 Budget Act that increased contributions from the General Fund to cover monthly obligations. This fund invests excess cash once a month, and the August's distribution variance was due to the delay in the investment of the General Fund contributions. November and December's distribution variance was due to greater benefit payments paid out for the month.

Treasury Analysis and Liquidity Status Report

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CalPERS

Judges' Retirement Fund II (JRF II)

The JRF II provides retirement benefits to California Supreme and Appellate Court Justices and Superior Court Judges first appointed or elected on or after November 9, 1994. This system provides a unique combination of two basic types of retirement benefits: a defined benefit plan and a monetary credit plan. The benefit payment is comprised of member contributions and a portion of employer contributions, plus interest. Monetary credits are incentives for judges to stay in their current position and are lump-sum payments.

Liquidity Coverage Ratio Analysis

$$\text{Liquidity Coverage Ratios (LCR)} = \frac{\text{cash + assets convertible to cash + incoming cash sources}}{\text{outgoing cash uses + contingent cash uses}}$$

Funding Sources

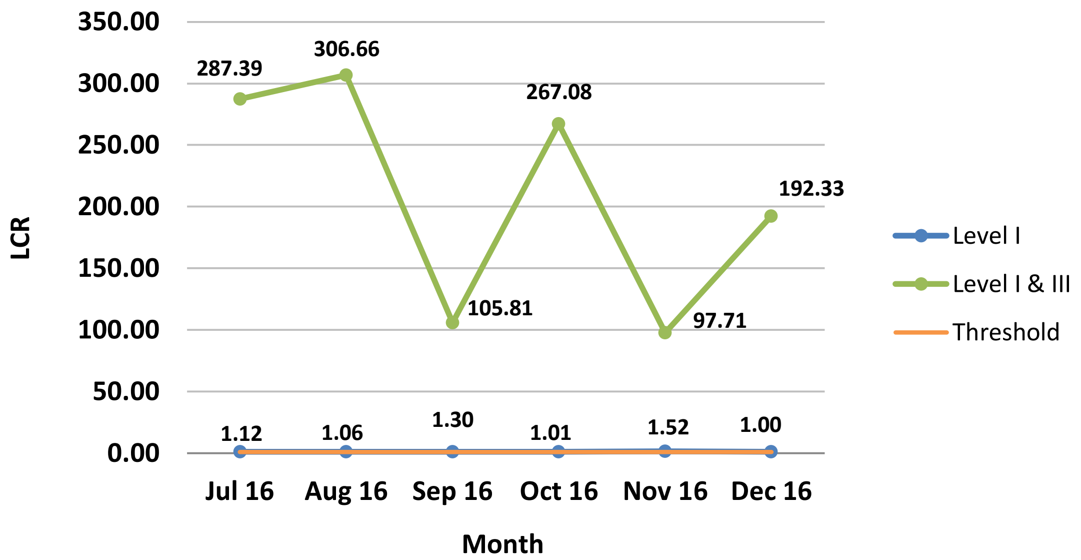
Level I: Cash and cash equivalents

Level III: Sale of public assets

Threshold: Indicates the Fund's ability to cover 100% of monthly obligations

Normal Environment - 30-Day Liquidity Coverage Ratios

The 30-day LCR included investment and non-investment available cash flows.



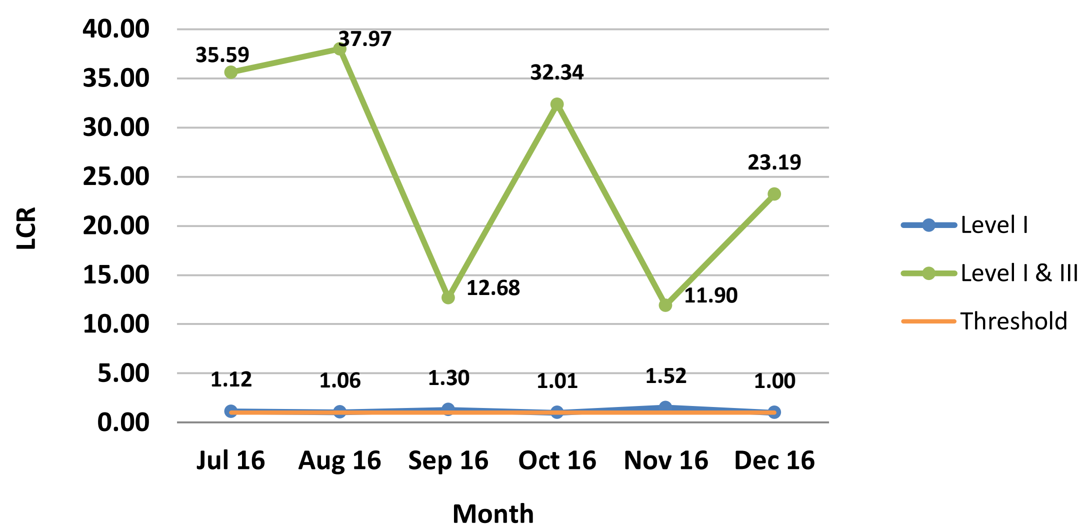
Level I: Level I LCRs remained above the threshold in July through December. The Fund does not maintain any private market investments therefore Level I LCRs were consistently at or just above 1.0.

Level I & III: Since Level I LCRs remained above the threshold, it was not necessary to utilize Level III assets. LCR fluctuations were due to monetary credit payments.

Stressed Environments - 30-Day Liquidity Coverage Ratios

Stressed environment LCR scenarios were calculated assuming starting assets were stressed by the percentages actually experienced over 5 days in the 1987 market crash and 30 days during September 2008. Starting assets were further reduced by a transactional liquidity % equal to the estimated % of the assets that could have been liquidated during the 30-day period. Under the stressed scenarios, asset class sources were reduced to zero.

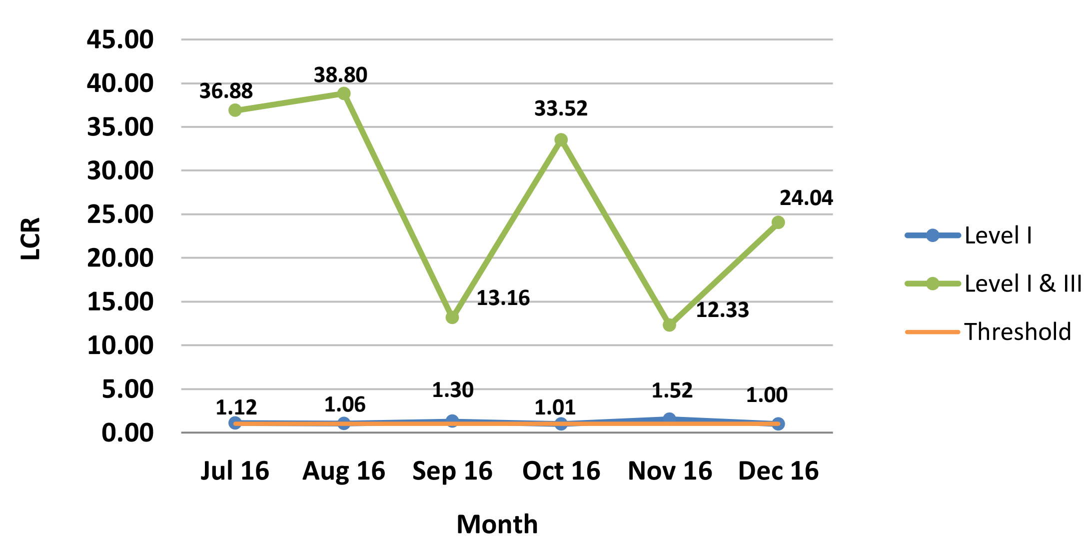
1987 Market Crash "Black Monday"



Level I: July through December Level I LCRs were adequate had a stressed event similar to "Black Monday" occurred. The Fund does not maintain any private market investments therefore Level I LCRs were consistently at or just above 1.0.

Level I & III: Level I and Level III assets were adequate had a stressed event similar to "Black Monday" occurred. LCR fluctuations were due to monetary credit payments.

2008 Liquidity Crisis

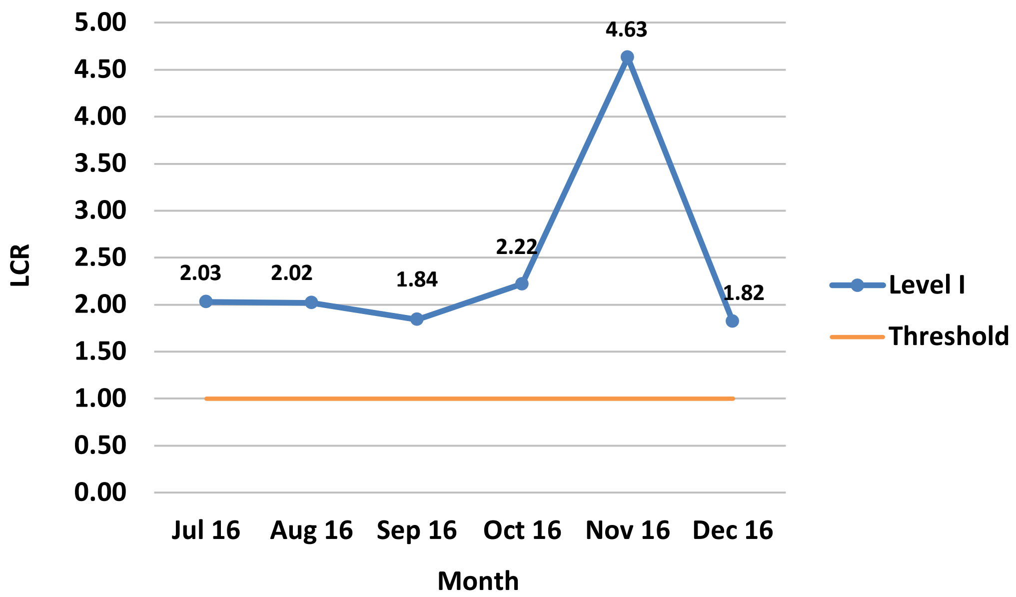


Level I: July through December Level I LCRs were adequate had a stressed event similar to the 2008 Liquidity Crisis occurred. The Fund does not maintain any private market investments therefore Level I LCRs were consistently at or just above 1.0.

Level I & III: Level I and Level III assets were adequate had a stressed event similar to the 2008 Liquidity Crisis occurred. LCR fluctuations were due to monetary credit payments.

Crisis Environment - 10-Day Liquidity Coverage Ratios

The 10-day LCR utilized only the cash balance ten days prior to the payment date. The calculation assumed a five business day market lockdown as experienced on September 11th, 2001.



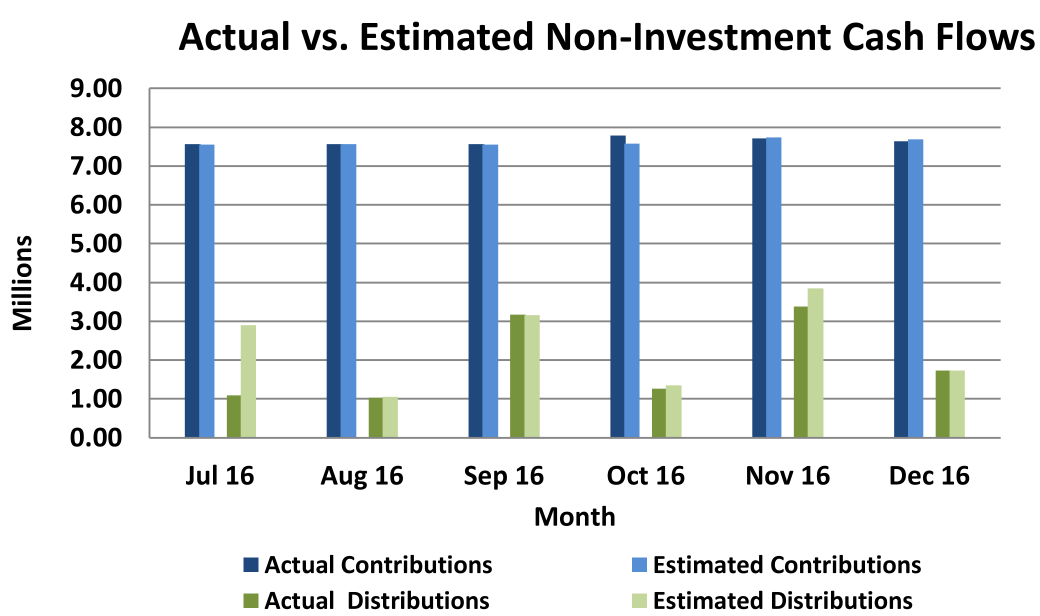
Level I: The JRF II had sufficient cash to cover obligations ten days prior to the payment date. This indicated Level I was adequate had a crisis event occurred. Fluctuations in LCRs were due to timing of a monetary credit payment. In a crisis environment, CalPERS would not have access to Level III assets since it is assumed there was a five business day market lockdown similar to September 11th, 2001.

Overall JRF II Liquidity Health

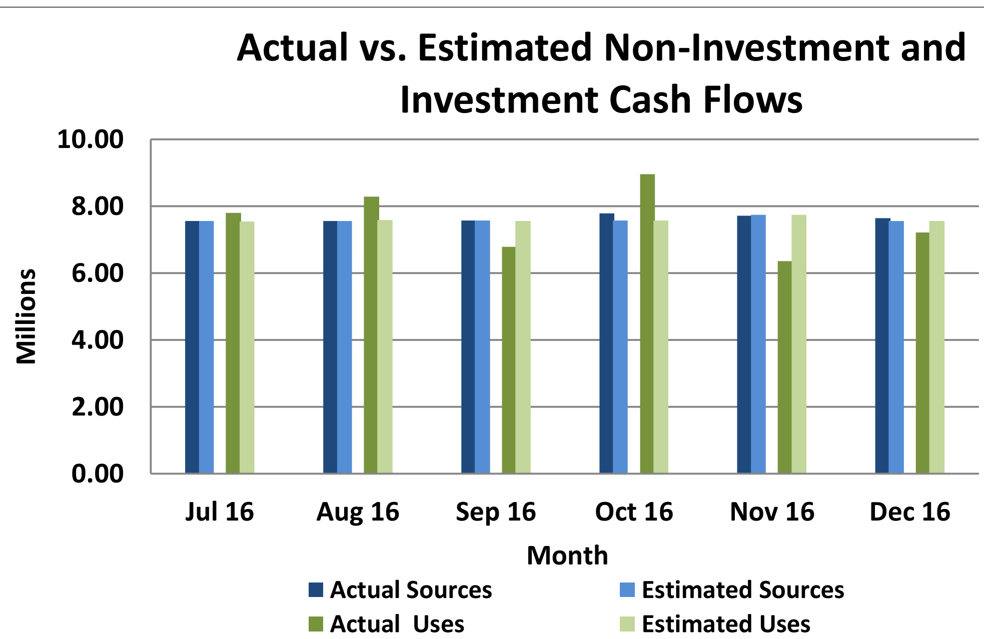
Coverage Ratio Analysis:

- ✓ JRF II was able to make payments for benefits and operating expenses regardless of market conditions.
- ✓ JRF II's liquidity remained above the threshold in the normal environment.
- ✓ JRF II's liquidity was adequate in stressed and crisis environments.
- ✓ Staff will continue to monitor JRF II's liquidity health using LCRs.

JRF II Cash Flow Forecasting



July's distribution variance was due to an over estimation of monetary credit outflows. August through December cash flow forecasting accuracy was in the 90th percentile.



October and November's use variance was due to timing of projected investments for the month.

Treasury Analysis and Liquidity Status Report

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CalPERS

Health Care Fund (HCF) / Contingency Reserve Fund (CRF)

The HCF accounts for the activities of the CalPERS self-insured health care programs. Health premiums are collected from employers and members and used to directly pay for medical services and pharmaceutical usage. The CRF was established to fund administrative costs related to the CalPERS health care programs and to provide a contingency reserve for potential increases in future health care premium rates or health care benefit costs. Since the CRF acts as a reserve fund for the HCF, activities for both funds are combined into one report.

Liquidity Coverage Ratio Analysis

$$\text{Liquidity Coverage Ratios (LCR)} = \frac{\text{cash + assets convertible to cash + incoming cash sources}}{\text{outgoing cash uses + contingent cash uses}}$$

Funding Sources and Graph Details

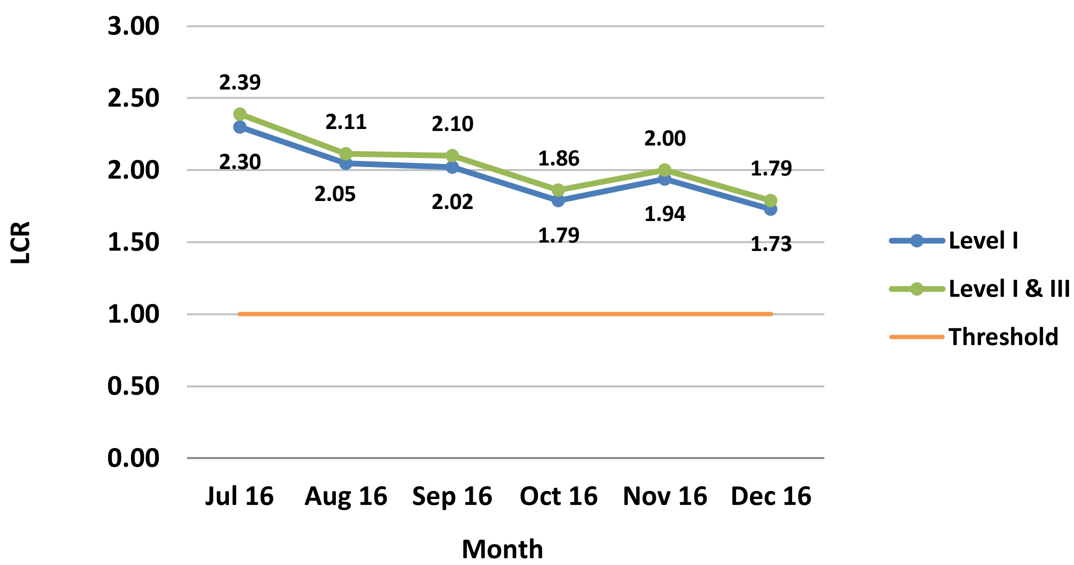
Level I: Cash and cash equivalents

Level III: Sale of public assets

Threshold: Indicates the Fund's ability to cover 100% of monthly obligations

Normal Environment - 30-Day Liquidity Coverage Ratios

The 30-day LCR included investment and non-investment available cash flows.

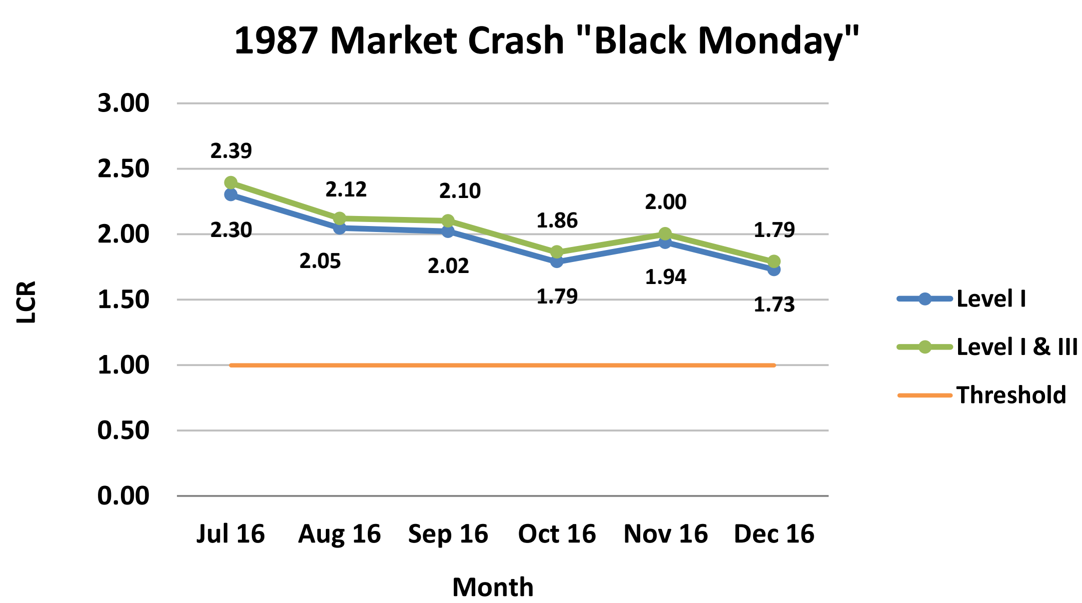


Level I: Level I LCRs remained above the threshold in July through December. The Fund maintained adequate inflows to cover monthly liabilities. The overall LCR decreased due to an increase in medical and pharmacy payments.

Level I & III: Since Level I LCRs remained above the threshold, it was not necessary to utilize Level III assets.

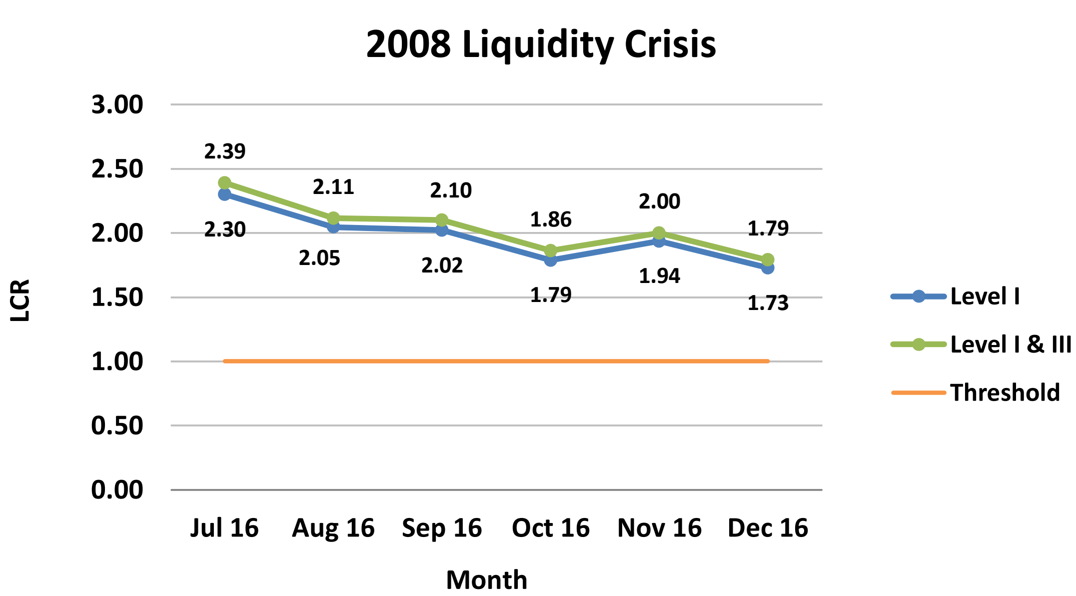
Stressed Environments - 30-Day Liquidity Coverage Ratios

Stressed environment LCR scenarios were calculated assuming starting assets were stressed by the percentages actually experienced over 5 days in the 1987 market crash and 30 days during September 2008. Starting assets were further reduced by a transactional liquidity % equal to the estimated % of the assets that could have been liquidated during the 30-day period. Under the stressed scenarios, asset class sources were reduced to zero.



Level I: July through December Level I LCRs were adequate had a stressed event similar to "Black Monday" occurred. Since 100% of Level I assets for CRF were held in cash and cash equivalents, stress factors did not apply and the LCRs remained the same as the normal environment.

Level I & III: Level I and Level III assets were adequate had a stressed event similar to "Black Monday" occurred. Since 100% of Level III assets for HCF were held in cash and cash equivalents and fixed income, stress factors had a minimal impact to LCRs. The overall LCR decreased due to an increase in medical and pharmacy payments.



Level I: July through December Level I LCRs were adequate had a stressed event similar to the 2008 Liquidity Crisis occurred. Since 100% of Level I assets for CRF were held in cash and cash equivalents, stress factors did not apply and the LCRs remained the same as the normal environment.

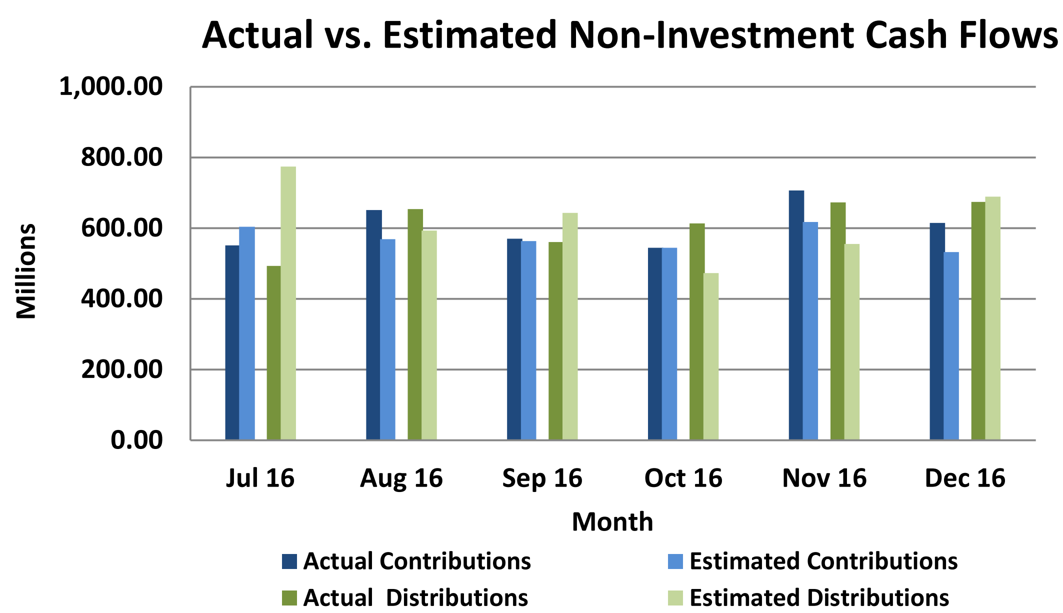
Level I & III: Level I and III assets were adequate had a stressed event similar to the 2008 Liquidity Crisis occurred. Since 100% of Level III assets for HCF were held in cash and cash equivalents and fixed income, stress factors had a minimal impact to LCRs. The overall LCR decreased due to an increase in medical and pharmacy payments.

Overall HCF / CRF Liquidity Health

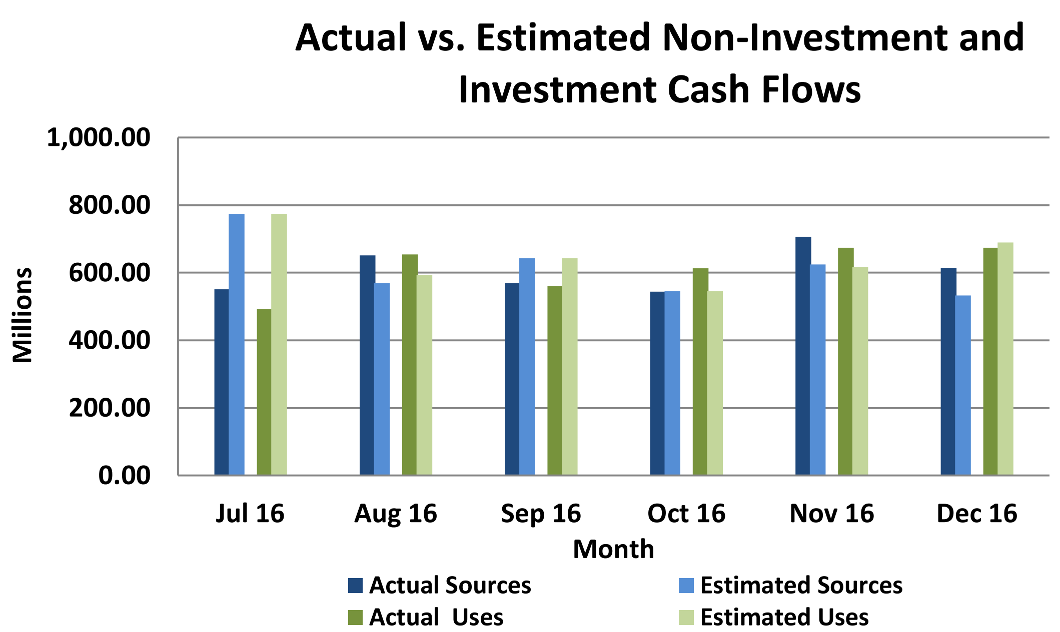
Coverage Ratio Analysis:

- ✓ HCF and CRF were able to make payments for health premiums, medical claims and operating expenses regardless of market conditions.
- ✓ HCF's and CRF's liquidity remained above the threshold in the normal environment.
- ✓ HCF's and CRF's liquidity were adequate in stressed environments.
- ✓ Staff will continue to monitor HCF's and CRF's liquidity health using LCRs.

HCF / CRF Cash Flow Forecasting



July's distribution variance was due to the delayed payment of premiums. August, November and December's contribution variance was due to unforeseen reimbursements received. August and September's distribution variance was due to the timing of medical pharmacy claims. October and November's distribution variance was due to an increase in medical and pharmacy claims.



Cash flow forecasting for total fund cash activities (both non-investment and investment) was slightly volatile. Components that drove the volatility were medical service claims, pharmaceutical claims and administrative costs. July's variance was due to forecasting the sale of investments to pay premium payments. Since actual premium payments were less than what was forecasted, the sale of investments did not occur.

Treasury Analysis and Liquidity Status Report

Prepared for: Finance and Administration Committee - Period ending December 31, 2016

CalPERS

Long Term Care Fund (LTCF)

The LTCF provides financial protection to active participants from the high cost of covered services caused by chronic illness, injury or old age. Long-Term Care products reimburse the cost for covered personal care (activities of daily living) services. LTCF participation is voluntary and benefits are funded by member premiums and the LTCF investment income.

Liquidity Coverage Ratio Analysis

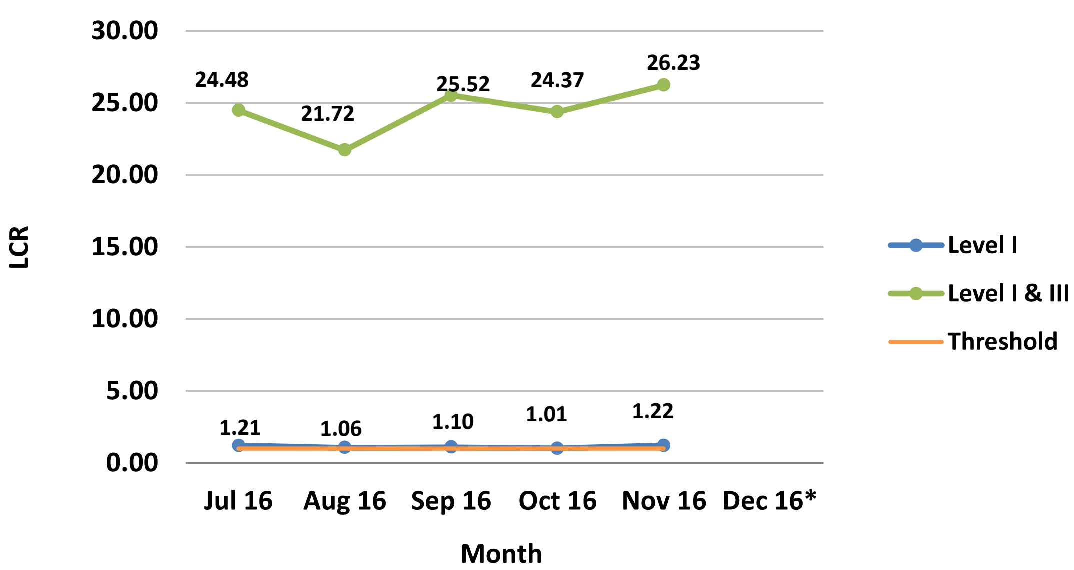
$$\text{Liquidity Coverage Ratios (LCR)} = \frac{\text{cash + assets convertible to cash + incoming cash sources}}{\text{outgoing cash uses + contingent cash uses}}$$

Funding Sources and Graph Details

Level I: Cash and cash equivalents
Level III: Sale of public assets
Threshold: Indicates the Fund's ability to cover 100% of monthly obligations

Normal Environment - 30-Day Liquidity Coverage Ratios

The 30-day LCR included investment and non-investment available cash flows.

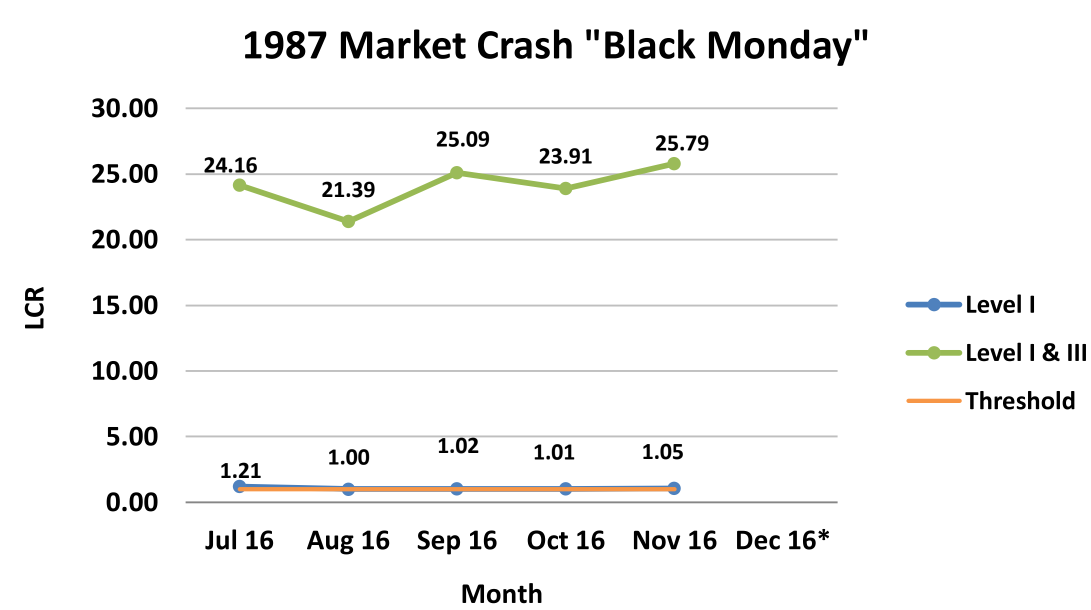


Level I: Level I LCRs remained above the threshold in July through November. The Fund does not maintain any private market investments therefore Level I LCRs were consistently at or just above 1.0.

Level I & III: Since Level I LCRs remained above the threshold, it was not necessary to utilize Level III assets. The overall Level I & III LCR increase was due to the decrease in monthly administrative expenses and medical claims.

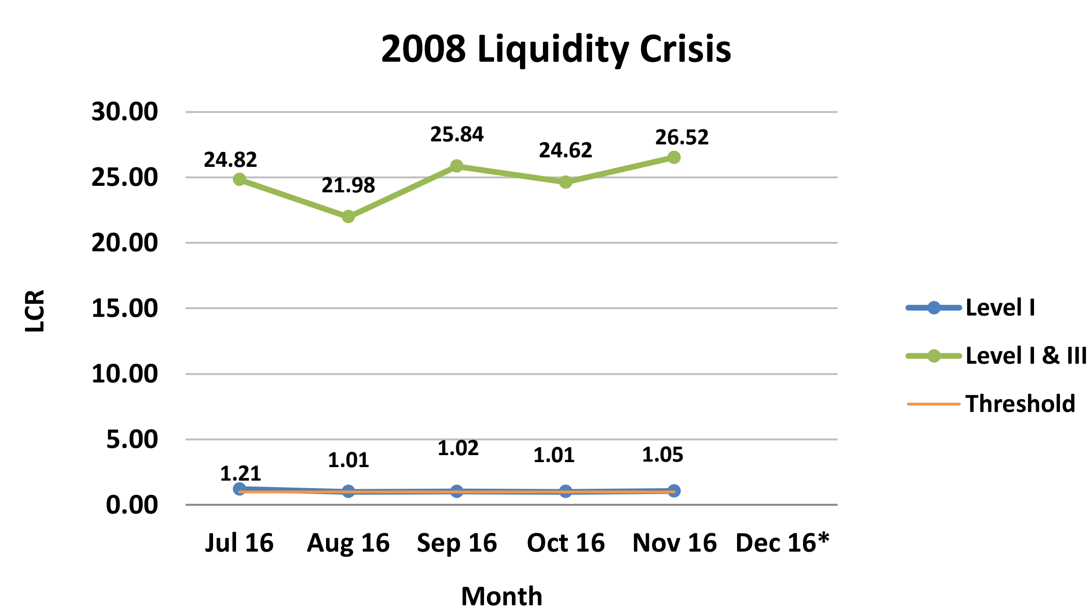
Stressed Environments - 30-Day Liquidity Coverage Ratios

Stressed environment LCR scenarios were calculated assuming starting assets were stressed by the percentages actually experienced over 5 days in the 1987 market crash and 30 days during September 2008. Starting assets were further reduced by a transactional liquidity % equal to the estimated % of the assets that could have been liquidated during the 30-day period. Under the stressed scenarios, asset class sources were reduced to zero.



Level I: Level I LCRs for July through November were adequate had a stressed event similar to "Black Monday" occurred. The Fund does not maintain any private market investments therefore Level I LCRs were consistently at or just above 1.0.

Level I & III: Level I and Level III assets were adequate had a stressed event similar to "Black Monday" occurred. The overall Level I & III LCR increase was due to the decrease in monthly administrative expenses and medical claims.



Level I: Level I LCRs for July through November were adequate had a stressed event similar to the 2008 Liquidity Crisis occurred. The Fund does not maintain any private market investments therefore Level I LCRs were consistently at or just above 1.0.

Level I & III: Level I and Level III assets were adequate had a stressed event similar to the 2008 Liquidity Crisis occurred. The overall Level I & III LCR increase was due to the decrease in monthly administrative expenses and medical claims.

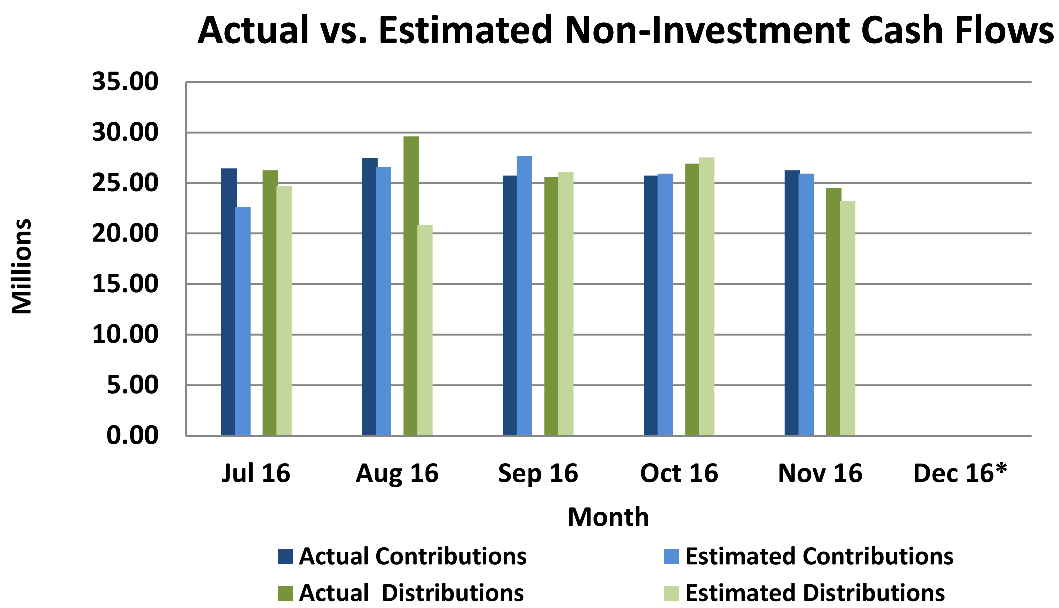
**December actuals were not reported due to 3rd party reports not available.*

Overall LTCF Liquidity Health

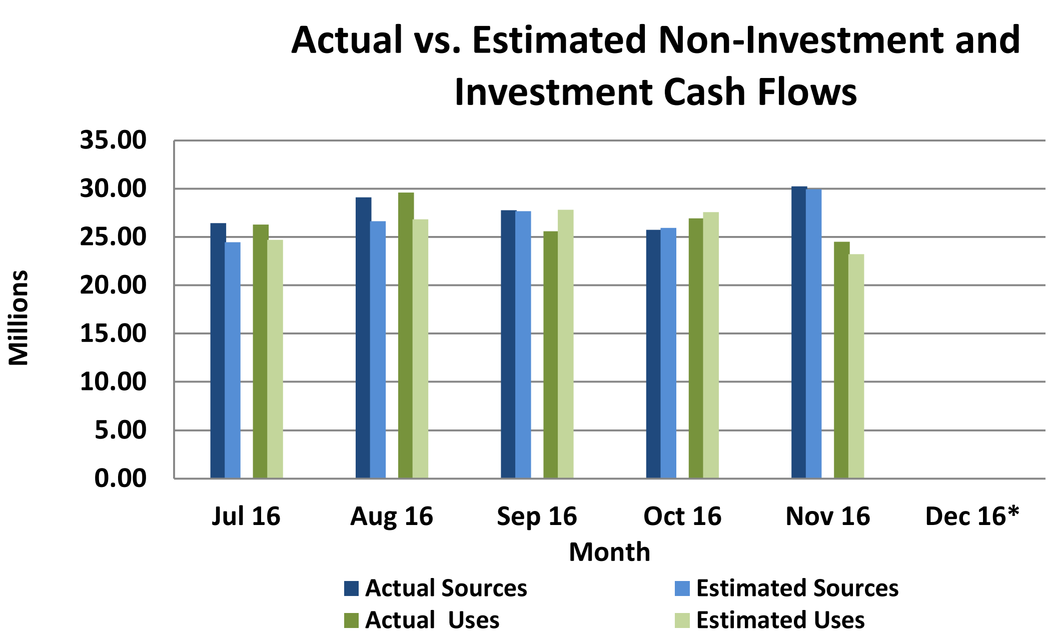
Based Coverage Ratio Analysis:

- ✓ LTCF was able to make payments for benefits and operating expenses regardless of market conditions.
- ✓ LTCF's liquidity remained above the threshold in the normal environment.
- ✓ LTCF liquidity was adequate in stressed environments.
- ✓ Staff will continue to monitor LTCF's liquidity health using LCRs.

LTCF Cash Flow Forecasting



October and November's cash flow forecasting accuracy was in the 90th percentile. July's contribution variance was due to an increase in unforeseen premiums. August and September's distribution variance was due to an increase in claim payments.



October and November's cash flow forecasting accuracy was in the 90th percentile. July's source variance was due to an increase in unforeseen premiums. August and September's uses variance was due to an increase in claim payments.

**December actuals were not reported due to 3rd party reports not available.*