ARIZONA STATE RETIREMENT SYSTEM

3300 NORTH CENTRAL AVENUE • PO BOX 33910 • PHOENIX, AZ 85067-3910 • PHONE (602) 240-2000
7660 EAST BROADWAY BOULEVARD • SUITE 108 • TUCSON, AZ 85710-3776 • PHONE (520) 239-3100
TOLL FREE OUTSIDE METRO PHOENIX AND TUCSON 1 (800) 621-3778
EMAIL ADDRESS: ASKMAC@AZASRS.GOV • WEB ADDRESS: WWW. AZASRS.GOV

Paul Matson
Director

AGENDA

NOTICE OF COMBINED PUBLIC MEETING AND POSSIBLE EXECUTIVE SESSIONS OF THE ARIZONA STATE RETIREMENT SYSTEM BOARD

3300 North Central Avenue, 10th Floor Board Room
Phoenix, AZ 85012

June 27, 2014
8:30 a.m. Arizona Time

Pursuant to A.R.S. § 38-431.02 (F), notice is hereby given to the Trustees of the Arizona State Retirement System (ASRS) Board and to the general public that the ASRS Board will hold a meeting open to the public on Friday, June 27, 2014, beginning at 8:30 a.m., in the 10th Floor Board Room of the ASRS offices at 3300 N. Central Avenue, Phoenix, Arizona 85012. Trustees of the Board may attend either in person or by telephone conference call.

The Chair may take public comment during any agenda item. If any member of the public wishes to speak to a particular agenda item, they should complete a "Request To Speak" form indicating the item and provide it to the Board Administrator.

This meeting will be teleconferenced to the ASRS Tucson office at 7660 East Broadway Boulevard, Suite 108, Tucson, Arizona 85710.

The Agenda for the meeting is as follows:

1. Call to Order; Roll Call; Opening Remarks ..... Mr. Tom Manos
   Board Chair

2. Approval of the Minutes of the May 23, 2014 Public Meeting of the ASRS Board (estimated time 1 minute to 8:36 a.m.) ..... Mr. Tom Manos

Regarding the following agenda item, pursuant to A.R.S. § 38-431.03(A)(3), notice is hereby given to Trustees of the ASRS Board and the general public that the ASRS Board may vote to go into executive session, which will not be open to the public, for the purpose of discussion or consultation for legal advice.

3. Approval, Modification, or Rejection of Administrative Law Judge's Recommended Decision Regarding Ms. Alice Shireman's Appeal of Survivor Benefits (estimated time 20 minutes to 8:56 a.m.) ..... Mr. Rex Nowlan
   Assistant Attorney General
   ..... Mr. Chris Munns
   Attorney General, Solicitor General Section

Regarding the following agenda item, pursuant to A.R.S. § 38-431.03(A)(3), notice is hereby given to Trustees of the ASRS Board and the general public that the ASRS Board may vote to go into executive session, which will not be open to the public, for the purpose of discussion or consultation for legal advice.

4. Approval, Modification, or Rejection of Administrative Law Judge's Recommended Decision Regarding Mr. Arthur Gross' Appeal of His Calculated Retirement Benefit (estimated time 20 minutes to 9:16 a.m.).....Mr. Rex Nowlan
.....Mr. Chris Munns

Regarding the following agenda item, pursuant to A.R.S. § 38-431.03(A)(3), notice is hereby given to Trustees of the ASRS Board and the general public that the ASRS Board may vote to go into executive session, which will not be open to the public, for the purpose of discussion or consultation for legal advice.

5. Approval, Modification, or Rejection of Administrative Law Judge's Recommended Decision Regarding Mr. Adam Morris' Appeal of Requested Contributions Not Withheld (estimated time 20 minutes to 9:36 a.m.) .....Mr. Rex Nowlan
.....Mr. Chris Munns

6. Presentation, Discussion and Appropriate Action Regarding the Actuarial Audits of the
    a. Pension Plan and Health Benefit Supplement Program
    b. Long Term Disability (LTD) Plan
    c. System

    (estimated time 60 minutes to 10:36 a.m.).....Mr. Paul Matson
    Director
    .....Mr. Ryan Falls, Senior Consultant & Actuary
    Gabriel, Roeder, Smith & Company
    ..... Mr. Charlie Chittenden
    Actuary, Buck Consultants

7. Presentation, Discussion, and Appropriate Action Regarding ASRS Investment Program Updates (estimated time 10 minutes to 10:46 a.m.) .....Mr. Gary Dokes
    Chief Investment Officer
    ..... Mr. Dave Underwood
    Assistant Chief Investment Officer
    a. ASRS Fund Positioning
    b. IMD Investment House Views
    c. Asset Class Committee (ACC) Activities
    d. Tactical Portfolio Positioning
    e. Strategic Asset Allocation Policy (SAAP) Implementation
    f. IMD Projects, Research, and Initiatives

8. Presentation, Discussion, and Appropriate Action Regarding Independent Reporting, Monitoring, and Oversight of the ASRS Investment Program Q1/2014 (estimated time 10 minutes to 10:56 a.m.).....Mr. Allan Martin
    Partner, NEPC

9. Presentation, Discussion, and Appropriate Action Regarding Board Elections (estimated time 5 minutes to 11:01 a.m.) ..... Mr. Tom Manos

10. Presentation, Discussion, and Appropriate Action Regarding the Director's Report as well as Current Events (estimated time 5 minutes to 11:06 a.m.) ..... Mr. Paul Matson
..... Mr. Anthony Guarino
Deputy Director and Chief Operations Officer
    a. 2014 Compliance Report
    b. 2014 Investments Report
    c. 2014 Operations Report
    d. 2014 Budget and Staffing Reports
    e. 2014 Cash Flow Statement
    f. 2014 Appeals Report
    g. 2014 Employers Reporting

11. Presentation and Discussion with Respect to Informational Updates from Prior and Upcoming Committee Meetings (estimated time 15 minutes to 11:21 a.m.)
    a. Operations and Audit Committee (OAC) ..... Mr. Jeff Tyne, Chair
    ..... Mr. Anthony Guarino
    The next OAC Meeting will be held on August 12, 2014
    b. External Affairs Committee (EAC) ..... Mr. Kevin McCarthy, Chair
    ..... Mr. Patrick Klein
    The next EAC Meeting will be held on September 12, 2014
    c. Investment Committee (IC) ..... Mr. Tom Connelly, Chair
    ..... Mr. Gary Dokes
    The next IC Meeting will be held on August 18, 2014

12. Board Requests for Agenda Items (estimated time 1 minute to 11:22 a.m.) ... Mr. Tom Manos

13. Call to the Public ..... Mr. Tom Manos

    Those wishing to address the ASRS Board are required to complete a Request to Speak form before the meeting indicating their desire to speak. Request to Speak forms are available at the sign-in desk and should be given to the Board Administrator. Trustees of the Board are prohibited by A.R.S. § 38-431.01(G) from discussing or taking legal action on matters raised during an open call to the public unless the matters are properly noticed for discussion and legal action. As a result of public comment, the Board may direct staff to study and/or reschedule the matter for discussion and decision at a later date.

14. The next public ASRS Board meeting is scheduled for Friday, August 22, 2014, at 8:30 a.m., at 3300 N. Central Avenue, in the 10th Floor Board room, Phoenix, Arizona.

15. Adjournment of the ASRS Board.

A copy of the agenda background material provided to Board Trustees (with the exception of material relating to possible executive sessions) is available for public inspection at the ASRS offices located at 3300 North Central Avenue, 14th Floor, Phoenix, Arizona and 7660 East Broadway Boulevard, Suite 108, Tucson, Arizona. The agenda is subject to revision up to 24 hours prior to meeting. These materials are also available on the ASRS website (https://www.azasrs.gov/web/BoardCommittees.do) approximately 48 hours prior to the meeting.

Persons with a disability may request a reasonable accommodation such as a sign language interpreter or alternate formats of this document by contacting Tracy Darmer, ADA Coordinator at (602) 240-5378 in Phoenix, at (520) 239-3100, ext. 5378 in Tucson, or 1-800-621-3778, ext. 5378 outside metro Phoenix or Tucson. Requests should be made as early as possible to allow time to arrange the accommodations.

Dated June 20, 2014

ARIZONA STATE RETIREMENT SYSTEM

Gayle Williams Date	Paul Matson Date
Board Administrator	Director

ARIZONA STATE RETIREMENT SYSTEM

3300 NORTH CENTRAL AVENUE • PO BOX 33910 • PHOENIX, AZ 85067-3910 • PHONE (602) 240-2000
7660 EAST BROADWAY BOULEVARD • SUITE 108 • TUCSON, AZ 85710-3776 • PHONE (520) 239-3100
TOLL FREE OUTSIDE METRO PHOENIX AND TUCSON 1 (800) 621-3778
EMAIL ADDRESS: ASKMAC@AZASRS.GOV • WEB ADDRESS: WWW. AZASRS.GOV

Paul Matson
Director

MINUTES
PUBLIC MEETING
ARIZONA STATE RETIREMENT SYSTEM BOARD

Friday, May 23, 2014
8:30 a.m., AZ Time

The Arizona State Retirement System (ASRS) Board met in the 10th Floor Board Room, 3300 N. Central Avenue, Phoenix, Arizona. Mr. Tom Manos, Chair of the ASRS Board, called the meeting to order at 8:31 a.m., Arizona Time.

The meeting was teleconferenced to the ASRS office at 7660 E. Broadway, Tucson, Arizona 85710.

1. Call to Order; Roll Call; Opening Remarks

Present: Mr. Tom Manos, Chair
Mr. Mike Smarik, Vice-chair
Mr. Brian McNeil
Professor Dennis Hoffman
Mr. Jeff Tyne
Mr. Kevin McCarthy
Mr. Marc Boatwright
Dr. Richard Jacob (via teleconference, minimal connection available)
Mr. Tom Connelly (via teleconference)

A quorum was present for the purpose of conducting business.

2. Presentation Regarding PRIDE Award for Results

Mr. Anthony Guarino, Deputy Director and Chief Operations Officer, recognized the following nominees for the PRIDE Award for Results: Website and GPS Development Team: (Dave King (Website Project Manager), Julie Lockwood (GPS Project Manager), Pamela Vozza, David Cannella, Sara Orozco, Carol English, LaToya Charles, Trent Kendall, Jean Langston, Frances Dyer, Donna McNally; Jean Langston; Erica Dunphy; TSD Unusual Suspects Team (RTW Workflow and Smart Form project): Trent Kendall, Sunitha Surendra, Srinivasa Attaluri with the assistance of consultants Divya Kuchal, Parameshwari Vonteddu, Vignesh Bhaskaran; Joy Fuentes; Member Advisory Center (MAC); and Molly Mahai, Gary Hummel, Sean Stevens, Bruce Pampel. They were nominated by staff who feel they exemplify the following PRIDE qualities of results:

- Meet goals and objectives
- Satisfy customers
- Complete projects
- Attain individual accomplishments
- Produce quality work products
- Successfully manage risks

DRAFT

Mr. Guarino presented the PRIDE Award for Results to the award winners, the Website and GSP Development Team. Members of the team are Dave King, Julie Lockwood, Pamela Vozza, David Cannella, Sara Orozco, Carol English, LaToya Charles, Trent Kendall, Jean Langston, Frances Dyer, and Donna McNally.

3. Approval of the Minutes of the April 25, 2014 Public Meeting of the ASRS Board

Motion: Professor Dennis Hoffman moved to approve the minutes of the April 25, 2014 Public Meeting of the ASRS Board. Mr. Brian McNeil seconded the motion.

By a vote of 8 in favor, 0 opposed, 0 abstentions, and 1 excused, the motion was approved.

4. Presentation, Discussion, and Appropriate Action Regarding a Study of Pre-retirement Salary Changes

Mr. Brian Crockett, Senior Management Analyst, presented an analysis of pre-retirement salary changes for ASRS members. The Board previously requested staff to prepare an analysis of actual salary changes of members leading up to retirement to determine; (1) If unusual pre-retirement salary patterns exist, and (2) If actuarial assumptions with respect to salary changes appear reasonable.

Mr. Crockett explained the analysis included all members who retired on or after July 1, 2008, and had a finalized retirement calculation completed prior to April 23, 2014; a cohort of approximately 43,000 retirees. The results of the analysis were grouped by salary change ranges and presented in aggregate as well as by distinct employer type. Mr. Crockett noted the analysis shows that, in general, there are limited increases in salary changes as a member approaches retirement. Mr. Crockett also noted that approximately 25% of the largest salary increases appeared to be related to change in employment status, meaning that members transitioned from part-time to full-time status. Based on the results of the last three 5-year experience studies, the salary scale used to determine future liability accruals and contribution rates appears appropriate for the actual salary changes experienced by members.

Mr. Crockett, Mr. Charlie Chittenden, Actuary, Buck Consultants, and Mr. Paul Matson, Director, responded to several questions from Trustees.

5. Presentation, Discussion, and Appropriate Action Regarding Strategic Topics to be Discussed by the Board During Fiscal Year 2015

Mr. Tom Manos, Chair, noted this topic resulted from Trustee requests to focus more on high-level strategic topics in Board meetings. Mr. Matson presented to the Board a list of potential strategically focused topics for discussion at Board meetings in the upcoming fiscal year. The topics were identified based on dialog at Board and Committee meetings, discussions between the Director and the Board Chair, and discussions between Executive Staff and Board Committee Chairs.

The potential topics presented were as follows, with specific staff to act as project managers, and specific trustees asked to serve as advisors as noted:

1. <u>Fiduciary Role of Trustees</u> *(Mr. Matson and Board Chair*)
   - Role of the Board
   - Strategic Direction and Overseeing Versus Management and Execution
   - Generational Equity Versus Funding Rapidity

DRAFT

2. Board Governance Model *(Mr. Matson and Board Chair*)
   - Optimal Reporting Requirements
   - Disseminating Consultant Opinions to the Board
   - Disseminating Staff Opinions to the Board
   - Incorporating Trustee Expertise within the Governance Model

Mr. Marc Boatwright requested "Developing Trustee Expertise" be added to Board Governance Model. Mr. Matson indicated he would add it to the topic.

3. Asset Allocation *(Mr. Matson, Mr. Dokes, Investment Committee Chair, and General Investment Consultant*)
   - Issues to Consider: Liabilities, Monetary Intervention, Diversification, Equity Allocations, Risks, Volatility, etc.
   - Current Objectives, Beliefs, etc.
   - Best / Most Appropriate Fit
   - Expected Long Term Rate-of-Return
   - Impacts of Changing the Long Term Rate-of-Return
   - Impacts of Not Meeting the Long Term Rate-of-Return
   - Peer & Non-Peer Comparative Implications (Corporate, Other States, Endowments)
   - Compared to Assumed Rate
   - Financial Implications for Funded Status
   - Financial Implications for Contribution Rates: Magnitude and Timing

Mr. Jeff Tyne requested adding a topic regarding generational equity as it relates to Trustees' roles as fiduciaries. Mr. Matson indicated he would add this idea to one of the strategic topics, possibly the asset allocation topic.

4. Operational Capacity *(Mr. Guarino and Operations and Audit Committee Chair*)
   - Budget Process
   - Staffing Strategies
   - Risks: IT Security, Investment Management, Customer Service

5. Member Service Paradigm *(Mr. Guarino and Operations and Audit Committee Chair*)
   - Current Services Offered
   - Current Challenges
   - Current Paradigm
   - Future Service Development
   - Communications
   - Compliance

6. Employer Service Paradigm *(Mr. Klein, Mr. Guarino and External Affairs Committee Chair*)
   - Current Services Offered
   - Current Challenges
   - Current Paradigm
   - Future Service Development
   - Communications
   - Compliance

7. Membership Rules *(Mr. Klein and External Affairs and Operations and Audit Committee Chairs*)
   - Current Definitions
   - Current Issues
   - Consideration of Possible Modifications

DRAFT

8. Health Care: Implications of Federal Legislation, Market Place Dynamics, and Key Economic Components of the ASRS Paradigm *(Mr. Matson, Mr. Klein, External Affairs and Operations and Audit Committee Chairs*)
   - Status Quo
   - Possible Direction of ASRS Health Insurance Programs
   - Impact of Exchanges on ASRS HI Programs
   - Retrospective Rate Adjustment and Converted Funds
   - Whole Case Underwriting

Trustees gave approval of the topics presented.

6. Notification of Upcoming Board Elections to Occur at the June 27, 2014 Board Meeting

Mr. Tom Manos, Chair, addressed the Board regarding upcoming Board elections to occur at the June 27, 2014 Board Meeting. Pursuant to the ASRS Board Governance Policy Handbook, the ASRS Board is to elect a Board Chair and Vice-chair for Fiscal Year 2014/2015. The new Chair and Vice-chair positions will become effective July 1, 2014, and will continue through June 30, 2015.

7. Presentation, Discussion, and Appropriate Action Regarding the Director's Report as well as Current Events

Mr. Matson presented the Director's Report, stating the Total Fund fiscal year to date rate of return is approximately 15 percent.

Mr. Matson noted responses to the RFP for the Retiree Health Insurance program have been received and a recommendation by the evaluation committee may be presented at the June 27 Board meeting.

8. Presentation and Discussion with Respect to Informational Updates from Prior and Upcoming Committee Meetings

a. Operations and Audit Committee (OAC)

Mr. Jeff Tyne, Chair, said the next OAC meeting will be held on June 10, 2014. Topics to be discussed are internal information technology security risk management and the FY16/17 budget.

b. External Affairs Committee (EAC)

Mr. Kevin McCarthy said the next EAC meeting will be held on September 12. Topics to be discussed are legislation for the next session and the strategic topic, "employer service paradigm."

c. Investment Committee (IC)

Mr. Tom Connelly, Chair, said the next IC meeting will be held on June 23, 2014. Total Fund 1Q review will be discussed. Tentative arrangements have been made for four external parties to dialog with the IC at the August 18 IC meeting on topics critical to asset allocation and smart beta. Mr. Connelly welcomed the Board and public to attend.

DRAFT

9. Board Requests for Agenda Items

No requests were made.

10. Call to the Public

Mr. Adam Lang, attorney for Ms. Bonnie Pendergast requested to speak. Mr. Lang addressed the Board giving a procedural history of the *Pendergast v. Arizona State Retirement System* case and encouraged the Board not to appeal.

11. Presentation, Discussion, and Appropriate Action Regarding *Pendergast v. Arizona State Retirement System* and possible Petition for Review to the Arizona Supreme Court

Motion: Professor Dennis Hoffman moved to go into executive session. Mr. Kevin McCarthy seconded the motion.

By a vote of 9 in favor, 0 opposed, 0 abstentions, and 0 excused, the motion was approved.

The Board convened into executive session at 9:40 a.m.

The Board reconvened into public session at 10:31 a.m.

Motion: Mr. Kevin McCarthy moved to direct counsel to proceed to file Petition for Review to the Arizona Supreme Court before June 2. Professor Dennis Hoffman seconded the motion.

By a vote of 8 in favor, 0 opposed, 0 abstentions, and 1 excused, the motion was approved.

12. The next ASRS Board meeting is scheduled for Friday, June 27, 2014, at 8:30 a.m., at 3300 N. Central Avenue, 10th Floor Board room, Phoenix, Arizona.

13. Adjournment of the ASRS Board

Mr. Tom Manos adjourned the May 23, 2014 Board meeting at 10:38 a.m.

ARIZONA STATE RETIREMENT SYSTEM

Lisa Maddox Date	Paul Matson Date
Board Administrator	Director

DRAFT

Confidential executive session minutes were provided to the Trustees and were not included in this packet.

Appeal materials were provided to the Board and were not included in this packet.

ARIZONA STATE RETIREMENT SYSTEM

3300 NORTH CENTRAL AVENUE • PO BOX 33910 • PHOENIX, AZ 85067-3910 • PHONE (602) 240-2000
7660 EAST BROADWAY BOULEVARD • SUITE 108 • TUCSON, AZ 85710-3776 • PHONE (520) 239-3100
TOLL FREE OUTSIDE METRO PHOENIX AND TUCSON 1 (800) 621-3778
EMAIL ADDRESS: ASKMAC@AZASRS.GOV • WEB ADDRESS: WWW. AZASRS.GOV

Paul Matson
Director

MEMORANDUM

TO: Mr. Tom Manos, Chair, Arizona State Retirement System (ASRS) Board

FROM: Mr. Paul Matson, Director

DATE: June 17, 2014

RE: **Agenda Item #6**: Presentation, Discussion, and Appropriate Action Regarding the Actuarial Audits of the:

a. Pension Plan and Health Benefit Supplement Program
b. Long Term Disability (LTD) Plan
c. System

Purpose

Every five years the ASRS conducts an actuarial audit. The most recent audit was completed by Gabriel Roeder Smith & Company (GRS) and is attached for presentation and discussion.

The scope of the audit included a review of the data used by the retained actuary, Buck Consultants; qualifications of the actuaries who perform the valuations of the plans administered by the ASRS; results of the valuations completed for the year ended June 30, 2013; and the reasonableness and appropriateness of the major actuarial assumptions and methods applied to them.

Additionally, GRS was asked to evaluate the current actuarial reports in terms of content, format, detail, clarity and scope; and also determine whether the retained actuary is following generally accepted best practices and to determine whether the Retirement Plan, Health Benefit Supplement Program and LTD Program's financial objectives of maintaining reasonably stable contribution rates and achieving an ultimate funded status of 100% are being met.

GRS was also asked to evaluate the general appropriateness, completeness, and conclusions of the June 30, 2012, quinquennial experience study and express an opinion on whether the current funding method could reasonably be expected to increase the funded status over a fixed 30-year period for the Retirement Plan, fixed 15-year period for the LTD Program and Health Benefit Supplement Program.

Finally, GRS was asked to express an opinion regarding whether or not the various fees (including valuations, experience study, cost letters and special projects) paid by the ASRS to the retained actuary are reasonable based on the level of services received.

As Director, I generally concur with the results of the audit and would make only one additional comment as follows:

> *Although the Arizona statutorily required 'Projected Unit Credit' actuarial cost methodology is reasonable, I am contemplating submitting a legislative change recommendation to the ASRS Board during 2014 that would enable the ASRS Board to change from the 'Projected Unit Credit' actuarial cost methodology to the 'Entry Age Normal' actuarial cost methodology.*

The purposes of this potential recommended change to the actuarial cost methodology are:

- Consistency with new GASB accounting standards,
- Improvement in comparability with other public systems.

The likely implications of this change, all else being held constant, would be:

- Modest reduction in funded status,
- Modest reduction in contribution rates.

At my request, Buck, the ASRS retained actuary, has provided an audit response to the Board, apprising the Board of any similar or different opinions, see attached.

Recommendation
Information item only; no action required.

Attachments:

- ASRS Report of an Actuarial Audit by Gabriel Roeder Smith & Company
- Audit Response by Buck Consultants

GRS Gabriel Roeder Smith & Company
Consultants & Actuaries

ARIZONA STATE RETIREMENT SYSTEM

REPORT OF AN ACTUARIAL AUDIT

JUNE 13, 2014

GRS
Gabriel Roeder Smith & Company
Consultants & Actuaries
5605 N. MacArthur Blvd.
Suite 870
Irving, TX 75038-2631
469.524.0000 phone
469.524.0003 fax
www.gabrielroeder.com

June 13, 2014

Retirement Board
Arizona State Retirement System
3300 North Central Avenue
14th Floor
Phoenix, Arizona 85012

Dear Retirement Board Members:

Gabriel, Roeder, Smith & Company (GRS) is pleased to present this report of an actuarial audit of the June 30, 2013 actuarial valuations of the Arizona State Retirement System (ASRS) retirement programs. The scope of our actuarial audit included the ASRS Plan (pension and health benefits), the ASRS System (pension and health benefits), and the Long Term Disability Program (LTD). We are grateful to the ASRS staff and Buck Consultants (Buck), the retained actuary, for their cooperation throughout the actuarial audit process.

This actuarial audit involves an independent verification and analysis of the assumptions, procedures, methods, and conclusions used by the retained actuary for ASRS, in the actuarial valuations of ASRS as of June 30, 2013, to ensure that the conclusions are technically sound and conform to the appropriate Standards of Practice as promulgated by the Actuarial Standards Board.

GRS is pleased to report to the Board, in our professional opinion, the June 30, 2013 actuarial valuations prepared by the retained actuary provide fair and reasonable assessments of the financial position of ASRS.

Throughout this report we make a number of suggestions for ways to improve the work product. We hope that the retained actuary and ASRS find these items helpful. Thank you for the opportunity to work on this assignment.

Mr. Falls is an Enrolled Actuary, a Fellow of the Society of Actuaries, and a Member of the American Academy of Actuaries. He meets the Qualification Standards of the American Academy of Actuaries to render the actuarial opinion contained herein. Both Mr. Falls and Mr. Ward are experienced in performing valuations for large public retirement systems.

Respectfully submitted,
Gabriel, Roeder, Smith & Company

R. Ryan Falls, FSA, FCA, MAAA, EA
Senior Consultant

Lewis Ward
Consultant

Table of Contents

Section	Item	Page
I	Executive Summary	2
II	General Actuarial Audit Procedure	6
III	Actuarial Assumptions	10
IV	Actuarial Methods	25
V	Funding Policy and Financial Objectives	28
VI	Actuarial Valuation Results	34
VII	Content of Valuation Report	40
VIII	ASRS Plan Design Features	44
IX	Final Remarks	48
Appendix		50

SECTION I

EXECUTIVE SUMMARY

Executive Summary

The Arizona State Retirement System (ASRS) engaged Gabriel, Roeder, Smith & Company (GRS) for an actuarial audit of the recent actuarial valuations, studies and reports on the ASRS Plan (pension and health benefits), the ASRS System (pension and health benefits), and the Long Term Disability Program (LTD) performed by the retained actuary.

This scope of this actuarial audit includes the following:

- Review and analysis of the results of the actuarial valuations for the year ended June 30, 2013, including an evaluation of the data used, for reasonableness and consistency as well as a review of the mathematical calculations for completeness and accuracy, based on a full replication of the actuarial valuations.
- Evaluate the actuarial cost method and the actuarial asset valuation method in use and whether other methods may be more appropriate for ASRS.
- Review the demographic and economic actuarial assumptions for consistency, reasonableness and compatibility. Such assumptions shall include, but are not limited to: mortality, retirement and separation rates, levels of pay adjustments, rates of investment return, inflation, Health Benefit Supplement eligibility rates, and disability rates.
- Determine whether the financial objectives of the retirement programs are being met based on the current funding policies.
- Confirm that the actuarial valuations are performed by qualified actuaries and assess the adherence to Actuarial Standards of Practice (ASOPs) published by the Actuarial Standards Board.

The scope of our engagement also includes a validation of the cost savings projections presented in the ASRS Cost Savings Initiatives matrix. The results of this validation will be communicated to the Board in a separate communication.

Summary of Findings

Based on our review of the census data, experience study documents, liability replication, liability calculations for a sample of members, and the actuarial valuation reports, we believe the June 30, 2013 actuarial valuations of the ASRS retirement programs are reasonable, are based on appropriate assumptions and methods, and the reports generally comply with the Actuarial Standards of Practice.

We offer the following recommendations based on the valuation methods and assumptions used by the retained actuary in the June 30, 2013 actuarial valuations of the ASRS Plan, the ASRS System, and the LTD Program.

Actuarial Assumptions

1. In order to improve the overall completeness of the next actuarial experience study report, we recommend the following:
    a. The retained actuary should include more detail regarding the "actuals" and "exposures" underlying the assumptions reviewed, and
    b. The retained actuary should provide a thorough analysis of the underlying inflation assumption and separately identify price inflation from wage inflation.

2. We recommend that the retained actuary modify the simplifying assumption used for the actuarial valuations of active members to assume that the post-retirement mortality assumption will be the mortality assumption for annuitants with benefits greater than $14,400.

3. We recommend that in future experience studies the retained actuary considers the impact of retirement incentives on observed retirement rates, both during the year of the retirement incentive as well as the year (or years) following the retirement incentive.

4. We recommend that in future experience studies the retained actuary thoroughly considers the economic cycle during the period that the assumptions are being studied and apply the appropriate level of weighting to the experience during the assumption setting process if that economic cycle is not expected to continue.

Actuarial Methods

5. We believe that the actuarial methods are reasonable and appropriately applied. As a result, we have no recommendations regarding the application of the actuarial methods.

Funding Policy and Financial Objectives

6. We recommend that the ASRS Board consider adopting a formal funding policy which would codify the decisions already made by the Board and the reasons behind the decisions. Additionally, the funding policy can document the steps taken to manage pension risks.

7. We recommend that the retained actuary discuss with the Board possible adjustments to the contribution calculation that will eliminate the current disconnects resulting from (1) the different contribution rates during the lag period, and (2) the calculation of the normal cost rate. The current approach to calculating the funding policy contribution will eventually incorporate these costs into the contribution. However, we believe that these adjustments will allocate the contributions to the most appropriate period of time and keep the contribution rates more stable.

Actuarial Valuation Results

8. In the next actuarial valuation, we recommend that the retained actuary incorporate actual pay history into their valuation of active participants and update the actuarial valuation of the Other-than-Plan retirees.

Content of Valuation Report

9. In order to improve the ability of the report to communicate the assumptions, methods and plan provisions incorporated into the actuarial valuations of the ASRS retirement programs, we recommend that the retained actuary incorporate the noted enhancements to future actuarial valuation reports.

SECTION II

GENERAL ACTUARIAL AUDIT PROCEDURE

General Actuarial Audit Procedure

At the commencement of this engagement, GRS requested the information necessary to thoroughly review the work product of the retained actuary. Specifically, GRS received and reviewed the following items:

- Actuarial valuation reports for the ASRS Plan, the ASRS System, and the Long Term Disability Program as of June 30, 2013,
- Actuarial Experience Study for the five-year period ending June 30, 2012,
- ASRS Investment Policy Statement, most recently revised August 23, 2013,
- ASRS Strategic Asset Allocation Policy Schematic, approved by the Board on May 24, 2013,
- A preliminary set of census data for plan participants and beneficiaries as of June 30, 2013 originally provided by ASRS to the retained actuary for the actuarial valuations,
- A final set of census data for plan participants and beneficiaries as of June 30, 2013 used by the retained actuary for the actuarial valuations, and
- Detailed liability calculations from the retained actuary for a sampling of 25 participants in the various retirement programs as of June 30, 2013.

In performing our review, we:

- Reviewed member handbooks and applicable statutes to understand the benefits provided by ASRS,
- Reviewed the appropriateness of the actuarial assumptions and methods,
- Reviewed the actuarial valuation reports,
- Replicated the calculation of the actuarial accrued liabilities in our actuarial valuation software, and
- Reviewed the detailed liability calculation of the sample lives, to ensure that the calculations were consistent with the stated plan provisions, actuarial methods and assumptions.

The actuarial audit findings, which follow, are based on our review of this information and subsequent correspondence with the retained actuary for clarification and further documentation.

Key Actuarial Concepts

An actuarial valuation is a detailed statistical simulation of the future operation of a retirement plan using the set of actuarial assumptions adopted by the governing board. It is designed to simulate all of the dynamics of such a retirement plan for each current participant of the plan, including:

- Accrual of future service,
- Changes in compensation,
- Leaving the plan through retirement, disability, withdrawal, or death, and
- Determination of and payment of benefits from the plan.

This simulated dynamic is applied to each active member in the plan and results in a set of expected future benefit payments for that member. Discounting those future payments for the likelihood of survival at the assumed rate of investment return produces the Total Present Value of Plan Benefits

(TPV) for that participant. The actuarial cost method will allocate this TPV between the participant's past service (actuarial accrued liability) and future service (future normal costs).

We believe that an actuarial audit should not focus on finding differences in actuarial processes and procedures utilized by the consulting actuary and the auditing actuary. Rather, our intent is to identify and suggest improvements to the process and procedures utilized by ASRS's retained actuary. In performing this actuarial audit, we attempted to limit our discussions regarding opinion differences and focus our attention on the accuracy of the calculations of the liability and costs, completeness and reliability of reporting, and compliance with the Actuarial Standards of Practice that apply to the work performed by ASRS's retained actuary

These key actuarial concepts will be discussed in more detail throughout this report.

Actuarial Qualifications

The June 30, 2013 actuarial valuations of the ASRS Plan, the ASRS System, and the LTD Program were signed by Mr. Charles E. Chittenden, FSA, EA, MAAA and Mr. Douglas J. Fiddler, ASA, EA, MAAA. Both Mr. Chittenden and Mr. Fiddler have attained the actuarial credentials noted on the signature line of the actuarial valuation reports and are compliant with Society of Actuaries Continuing Professional Development requirement.

The June 30, 2013 actuarial valuation of the LTD Program was also signed by Mr. Reza Vahid, FSA, MAAA. Mr. Vahid has attained the actuarial credentials noted on the signature line of the actuarial valuation report and is compliant with Society of Actuaries Continuing Professional Development requirement.

In all cases, the actuarial valuation reports indicate that the signing actuaries meet the Qualification Standards of the American Academy of Actuaries to render the actuarial opinions contained in the actuarial valuation reports.

Actuarial Fees

As part of the actuarial audit, GRS was asked to express an opinion regarding whether or not the various fees paid by ASRS to the retained actuary are reasonable. ASRS provided GRS with the current fee schedule with their retained actuary as well as the actual invoices prepared by the retained actuary from July 2011 through February 2014.

The fee schedule indicates that ASRS pays the retained actuary a total of $109,000 for the annual actuarial valuations of all three retirement programs. Additionally, the fee schedule indicates that ASRS pays the retained actuary a total of $73,500 for the experience studies, as needed. It should be noted that the retained actuary also provides a 10% to 20% volume discount depending on the amount of business that is conducted. These fixed fees for actuarial valuations and experience studies appear to be reasonable based on our experiences with similarly sized retirement systems. The hourly rates charged by the retained actuary for services outside of the fixed fee ($175 to $395 per hour) also appear to be reasonable based on our experiences with similarly sized retirement systems.

The total fees that ASRS has paid to the retained actuary over the period from July 2011 through February 2014 have averaged approximately $80,500 per month (or close to $1 million per year). This total may be on the high-end of fees paid by similarly sized retirement systems. However, the total

fees are highly dependent on the number of requests, and the complexity of the requests, made by ASRS of their retained actuary. The retained actuary does provide the total number of hours worked, by project, on the monthly invoice. This detail should allow ASRS to monitor the number of hours worked, by project, and make sure that the number of hours charged are commensurate with the expectations of ASRS and the results of the request.

Ultimately, if ASRS is pleased with the work product of their retained actuary, then the various fees paid by ASRS to their retained actuary are reasonable.

SECTION III

ACTUARIAL ASSUMPTIONS

Actuarial Assumptions

Overview

The set of actuarial assumptions is one of the foundations upon which an actuarial valuation is based. An actuarial valuation is, essentially, a statistical projection of the amount and timing of future benefits to be paid under a retirement program. In any statistical projection, assumptions as to future events will drive the process. Actuarial valuations are no exception.

The actuarial valuation reports for all of the ASRS retirement programs contain descriptions of the actuarial assumptions which were used in the actuarial valuations as of June 30, 2013. Additionally, the retained actuary published an actuarial experience study report, dated July 24, 2013. We conducted a thorough review of these documents in order to assess the reasonableness of the assumptions used in the actuarial valuations.

It is important to understand the nature of the retirement plan and the plan sponsor when assessing the reasonableness of the actuarial assumptions. No projection of future events can be labeled as "correct" or "incorrect". However, there is a "range of reasonableness" for each assumption. We evaluated each individual assumption as follows:

- Whether or not they fall within the range of reasonableness, and
- If they fall within that range, whether they are reasonable for the actuarial valuation of the plan.

Actuarial assumptions for the valuation of retirement plans are of two types: (i) demographic assumptions, and (ii) economic assumptions. We have assessed the reasonableness of both types as part of this actuarial audit.

Demographic Assumptions

General

These assumptions simulate the movement of participants into and out of plan coverage and between status types. Key demographic assumptions are:

- turnover among active members,
- retirement patterns among active members, and
- healthy retiree mortality.

In addition, there are a number of other demographic assumptions with less substantial impact on the results of the process, such as:

- disability incidence and mortality among disabled benefit recipients,
- mortality among active members,
- distribution of form of payment selection, and
- percent of active members who are married and the relationship of the ages of participants and spouses.

Because ASRS also administers the 401(h) health care benefit as part of the ASRS Plan and the LTD Program, there are additional assumptions that have importance that are not generally part of a standard pension plan valuation. These assumptions are:

- The number of retired members electing the 401(h) health care benefit which is dependent on the number of retired members electing the State health care plan,
- Offsets to benefits payable to members on LTD, and
- Incurred but not reported (IBNR) liability for LTD claims.

Demographic assumptions for retirement programs are normally established by statistical studies of recent actual experience, called experience studies. Such studies underlie the assumptions used in the valuations.

Once it is determined whether or not an assumption needs adjustment, setting the new assumption depends upon the extent to which the current experience is an indicator of the long-term future. The measurement of experience is normally affected by simply counting occurrences of an event. For example, in reviewing retirement patterns, an actuary might count the number of actual retirees among males aged 50 with 20 years of service. These retirements would be compared against the number of total people in that group to generate a raw rate of retirement for that group.

- Full credibility may be given to the current experience. Under this approach the new assumptions are set very close to recent experience.
- Alternatively, the recent experience might be given only partial credibility. Thus, the new assumptions may be set by blending the recent experience with the prior assumption.
- If recent experience is believed to be atypical of the future, such knowledge is taken into account.

Finally, it may be determined that the size of the plan does not provide a large enough sample to make the data credible. In such cases, the experience of the plan may be disregarded and the assumption is set based upon industry standards for similar groups.

Actuarial Experience Study Report – Demographic Assumptions

We believe that the discussion section of the actuarial experience review report, dated July 24, 2013, did an adequate job of describing each assumption, providing context for the basis of each assumption, and outlining the reason for the proposed assumption going forward.

The report did not contain any information concerning the actual number of members that left active service during the experience period (actuals) nor the number of members that were exposed to the forces that cause members to leave active service (exposures). The report does contain tables that show the percentages of members leaving active service (actual-to-expected ratios, or "A/E ratios") for both the current assumptions and the proposed assumptions. Without the context of these numbers it is difficult to analyze some of the changes made to the assumptions. For example, when an A/E ratio changes from 160% to 105% (withdrawal assumption for males with 28 years of service as noted on page 78 of the experience study report), did the expected number of terminations increase by several dozen or by one or two?

We recommend that the retained actuary include more detail regarding the "actuals" and "exposures" underlying the assumptions reviewed as part of the next experience study.

We have additional comments related to the mortality rates and the retirement rates. These comments will be discussed in the following sections.

Observations on Assumptions

Overall, it appears that the current demographic assumptions are reasonable. Below, we offer general observations and considerations for the retained actuary based on our experiences with similar plans.

Healthy Post-Retirement Mortality – The most important demographic assumption is post-retirement mortality because this assumption is a predictor of how long pension payments will be made. The current post-retirement mortality assumption is based on the 1994 Group Annuity Mortality (94GAM) table with mortality improvements projected to 2015 using projection scale BB. The mortality assumption is further adjusted based on the size of the member's benefit. Specifically, healthy retirees who are receiving annual retirement benefits from ASRS of less than $6,000 are assumed to have a shorter life expectancy than the base assumption. Similarly, healthy retirees who are receiving annual retirement benefits from ASRS of greater than $14,400 are assumed to have a longer life expectancy than the base assumption.

There is ample evidence that a retiree's economic status is a factor in their rates of mortality; therefore, the use of different rates of mortality based on benefit size is very justified. In addition, the retained actuary has selected rates of mortality that appear to provide reasonable margins in the rates of mortality to allow for future mortality improvement.

We believe that this assumption is reasonable and appropriately applied to the current annuitants receiving a benefit from ASRS retirement programs.

However, we have some concerns about how this post-retirement mortality assumption is incorporated into the actuarial valuation of the current active members (future retirees). The retained actuary used a simplifying assumption that applies the healthy post-retirement mortality assumption "with no adjustments for small or large benefits" to all future termination and retirement annuity benefits. The result of this simplifying assumption is that the life expectancy for all current active members is based on the mortality table applicable to annuitants receiving a benefit between $6,000 and $14,400.

We understand it would be very complicated for the retained actuary to directly apply the stated post-retirement mortality assumption, as it is currently constructed, in the actuarial valuation of the active members. Most actuarial valuation systems would not allow the user to change the post-retirement mortality assumption at each projected retirement age for active members. As a result, we believe that the use of a simplifying assumption for post-retirement mortality, as it is currently constructed, is reasonable for the actuarial valuation of the active members.

As an illustration, the average active member in the ASRS Plan as of June 30, 2013 was approximately 46 years old with 10 years of service and was earning $43,000 per year. Based on the June 30, 2013 actuarial assumptions, the average member's projected retirement benefits are summarized in the following table.

Age at Retirement	Projected Benefit	Benefit Category	Probability of Receipt
50	$7,200	Between $6,000 and $14,400	3.2%
51	8,800	Between $6,000 and $14,400	3.1%
52	10,600	Between $6,000 and $14,400	2.9%
53	12,700	Between $6,000 and $14,400	2.8%
54	14,900	Greater than $14,400	2.7%
55	17,500	Greater than $14,400	2.5%
56	22,300	Greater than $14,400	6.1%
57	27,700	Greater than $14,400	5.4%
58	31,300	Greater than $14,400	7.3%
59	34,200	Greater than $14,400	6.9%
60	36,800	Greater than $14,400	8.1%
61	39,900	Greater than $14,400	6.3%
62	43,300	Greater than $14,400	4.7%
63	46,300	Greater than $14,400	2.8%
64	49,400	Greater than $14,400	2.2%
65	52,700	Greater than $14,400	2.9%

As the table illustrates, it would be more appropriate to apply a simplifying assumption that this member will have the assumed mortality for annuitants with benefits greater than $14,400.

The final June 30, 2013 actuarial valuation data includes approximately 24,000 healthy retired members that have a retirement date after June 30, 2010. The level of benefits for these new retirees can be summarized as follows:

Benefit Category	Number of Retirees	% of Retirees	Total Annual Benefits	% of Total Benefits
Less than $6,000	6,311	26%	$19,059,611	4%
Between $6,000 and $14,400	5,823	24%	57,222,725	12%
Greater than $14,400	11,826	50%	396,489,418	84%
Total	**23,960**		**$472,771,754**	

Approximately 50% of the new healthy retirements over the past three years are receiving annual benefits greater than $14,400. However, from the perspective of the percentage of annual benefits being paid, the new healthy retirees over the past three years that are receiving annual benefits greater than $14,400 are receiving 84% of the total annual payments to these new retirees. Conversely, the new healthy retirees with annual benefits less than $14,400 are only receiving 16% of the total annual payments to these new retirees.

The use of a simplifying assumption of using the unadjusted mortality rates (rates for members with annual benefits between $6,000 and $14,400) will result in actuarial losses each valuation cycle. That is because, within each new group of retiring members, the majority of these new retirees will ultimately be valued with the mortality for annuitants with benefits greater than $14,400. Additionally, since the $14,400 threshold is a static assumption, the ratio of future retirees exceeding this threshold will continue to increase over time due to inflationary forces.

We believe that the retained actuary should use a simplifying assumption that applies the healthy post-retirement mortality assumption for annuitants with annual retirement benefits greater than $14,400 (the assumption that assumes a longer life expectancy for a larger benefit).

This simplifying assumption would be conservative because there are definitely current active members with projected benefits that are less than $14,400. As a result, the use of this simplifying assumption will result in actuarial gains as each new group of retiring members commences their benefits. However, the magnitude of the actuarial gains will be significantly smaller in size than the actuarial losses resulting from the current simplifying assumption.

Our primary recommendation is that the retained actuary modify the simplifying assumption for the actuarial valuation of active members to assume that their post-retirement mortality assumption will be the mortality assumption for annuitants with benefits greater than $14,400. We estimate that this modification will increase the actuarial accrued liability for active members by approximately $300 million (which equates to approximately a 2% increase in the actuarial accrued liability for active members).

For the next experience study, we encourage the retained actuary to explore alternate methods of analyzing mortality experience (e.g., benefit weighted, liability weighted, etc.) that will result in a mortality assumption that can be more directly incorporated into their actuarial valuation software. As previously stated, there is evidence that a retiree's economic status is a factor in their rates of mortality and we support the general approach of reflecting these differences.

Disabled Mortality – The experience study report also included a recommendation that the mortality assumption for disabled lives be returned to the assumption that was in place prior to 2008. This appears to be the elimination of a 10-year set forward in the disabled life mortality table. Based on the A/E ratios in the experience study report, the proposed assumptions do not fit the data particularly well. However, this is often the case when analyzing disabled mortality. The current assumption does appear to be a significant improvement over the prior assumption and does appear to be reasonable in aggregate.

Retirement – Members are eligible to retire with an unreduced benefit at age 65, at age 62 if they have at least 10 years of service, or Rule of 80 (for members hired after July 1, 2011 the Rule of 80 has been replaced with age 60 and 25 years of service or age 55 with 30 years of service). Members are eligible for a reduced benefit at age 50 with five years of service. The rates at which participants are assumed to retire are based on the member's service. The current assumption was developed to be consistent with a portion of the actual experience over the most recent experience study period. The retained actuary noted that they excluded from the study all members who retired as part of an early retirement incentive offer. In our experience, when an early retirement incentive impacts the analysis of retirement rates it not only impacts the year in which it was offered but also impacts the year (or years) following the incentive (depending upon how strong the incentive was). In other words, an increase in the number of retirements in the year of the incentive is followed by a dearth of retirements in the year (or years) that follow.

The following table shows a simple example. Assume that we have 20 employees who are eligible to retire and that, each year, two are expected to retire and two new employees will become eligible to retire. Columns 2 and 3 show the expected experience without a retirement incentive. Columns 4 and 5 show the impact of a retirement incentive in Year 3. The retirement incentive results in two additional retirements in Year 3. These employees were expected to retire in Year 4 and now they

don't because they are already retired. Also, note that the number of eligible retirements is less in Year 4, as well, because there are still only two new employees that become eligible to replace the four actual retirements.

Time Frame	Without Retirement Incentive		With Retirement Incentive	
	Eligible to Retire	Number of Retirements	Eligible to Retire	Number of Retirements
(1)	(2)	(3)	(4)	(5)
Year 1	20	2	20	2
Year 2	20	2	20	2
Year 3	20	2	20	4
Year 4	20	2	18	0
Year 5	20	2	20	2

If we include all 5 years of the study, the retirement rate is 10% per year without the retirement incentive and 9.8% per year with the retirement incentive. If members who retired as part of the retirement incentive are excluded (or exclude only Year 3 from the analysis) the resulting retirement rate from the analysis would be 7.5% (or, 6 divided by 80). Note, however, that if both the year with the incentive and the year following the incentive are excluded from the results then the retirement rate returns back to 10%.

Overall, we believe that the current retirement assumption is reasonable for the ASRS retirement programs. Given the lack of "actuals" and "exposures" detail in the experience study report regarding the numbers of retirements, it is difficult for us to comment further on this assumption. In future experience studies, we recommend that the retained actuary consider the impact of retirement incentives on observed retirement rates, both during the retirement incentive as well as the year (or years) following the retirement incentive.

Turnover – The rates at which members are assumed to withdraw (or turnover) prior to eligibility for retirement are based on the member's service. The current assumption was developed to be consistent with the actual experience of the ASRS retirement programs over the most recent experience study period. The prior assumption was based on both age and service. In our experience, most often turnover rates are more closely associated with service than with age and therefore, we agree with the retained actuary's decision to use service based rates. We believe that the turnover rate assumption is reasonable for the ASRS retirement programs.

Pre-Retirement Mortality – The current pre-retirement mortality assumption for active members is based on the 1994 Group Annuity Mortality (94GAM) table. Specifically, the assumption that active members die prior to commencing their retirement benefit is 50% of the 94GAM tables projected to 2015 using projection scale BB. This pre-retirement mortality assumption is different than the post-retirement mortality assumption at the same ages.

It is often the case that the observed pre-retirement mortality of active members is notably different than post-retirement mortality at the ages where members are eligible to retire. This difference is most likely the result of members that are eligible to retire while in poor health, electing to retire, and then subsequently dying shortly thereafter. This results in proportionately fewer pre-retirement deaths in the active membership and proportionately more post-retirement deaths in the early years of retirement. This effect appears to be the case with the ASRS retirement programs. Based on the information in the experience study it appears that the mortality assumption for the active employees is reasonable.

Disability Incidence – The current assumption for disability incidence is based on a member's age. The assumption was modified during the experience study to reflect lower rates of disability than were previously assumed. The current assumption appears to be reasonable.

Health Insurance Benefit (HIB) Elections – The current assumption is that 60% of future retirees will receive the HIB and that the proportion of those retirees who also get the dependent premium will be 40%. The assumption is extended into the first year of retirement with actual elections applying after the first year. The current assumption appears to be reasonable.

Load for Optional Form Selection – The current assumption is a load of 0.174% to retirement and termination benefits for the impact of the optional forms of payment not being actuarially equivalent to the single life annuity normal form of payment. There was no information contained in the experience study to support the assumption or to allow a third party to evaluate the assumption.

Alternate Contribution Rate – The retained actuary offsets the amortization payment for unfunded liabilities by an amount equal to the alternative contribution rate multiplied by the payroll for members on whom the alternative contribution rate is made (rehired retirees). In most systems that we work with that have this type of arrangement, the additional contributions received are used to reduce the unfunded liabilities in the year they are received and they are not counted on as a future source of funding. We would remind the retained actuary and ASRS that by making this assumption the retained actuary is assuming that the payroll for this group of members will remain constant over the remaining amortization period. There is no documentation in the experience study report to support this assumption. However, that does not mean the assumption is unreasonable.

Adjustment for Contribution Timing – The retained actuary changed the assumption for the timing of when contributions are received from the beginning of the year to throughout the year. The current assumption is reasonable and appropriate.

LTD Rates of Termination of Claims due to Death or Recovery – The retained actuary assumes that members receiving LTD benefits may cease receiving benefits both due to death and recovery from disability. The experience study indicated that the A/E ratio was 132% for males and 163% for females over the experience period studied which indicates that a change in the assumption is warranted. The retained actuary recommended a significant increase (50%) over the prior assumption which resulted in an A/E ratio of 88% for males and 109% for females. It appears that the recent increase in the assumed rates may have "over corrected" for the males. To reduce the possibility of future actuarial losses, we recommend that in the next experience study the retained actuary consider modifications to the assumption in a manner that result in an A/E ratio for both males and females closer to, or in excess of, 100%.

Offsets for Disabled and Active Members – The current assumption is that 90% of members receiving LTD benefits will have an offset to their benefits within three years of becoming disabled. It is assumed that for members with offsets, their average offset will be equal to 45% of their benefit. This assumption appears to be reasonable.

IBNR Load Assumption – The current assumption is a 20% load to the liability for new LTD recipients. This load is to reflect the fact that members have become disabled, and therefore are no longer in the active population that is being valued, but they have not yet been approved for their LTD benefit. This assumption appears to be reasonable.

Post-Retirement Mortality for all ASRS System Members – The current assumptions are the 1994 Group Annuity Mortality table with fully generational projections using Scale BB with adjustments for benefits over $14,400 and under $6,000. These are further adjusted by adding a one year age setback for males and a two year age setback for females. The experience study report indicates that there is insufficient data to make any analysis of these assumptions credible. Based on this assessment of credibility, we would expect that the same mortality assumption would be used for ASRS Plan and ASRS System retirees. If separate assumptions are to be used, then we recommend that the retained actuary include justification in their next experience study report of why the mortality assumption should be different for the ASRS System. Ultimately, the mortality assumption for the ASRS System is more conservative than the assumption for the ASRS Plan so we believe that this assumption is reasonable.

Other Assumptions – The actuarial valuation also utilizes several other assumptions, some of which include: (1) percentage of active members who are married, (2) assumed difference in age of the member and spouse, and (3) the percent of terminating members electing a refund or deferred annuity. Each of these other assumptions is reasonable.

Economic Assumptions

General

These assumptions simulate the impact of economic forces on the amounts and values of future benefits. Key economic assumptions are the assumed rate of investment return and assumed rates of future salary increase. All economic assumptions are built upon an underlying inflation assumption.

Actuarial Experience Study Report – Economic Assumptions

The report did not have any discussion or analysis about core price inflation. Usually, the inflation assumption is the building block of the economic assumptions (see discussion below about consistency). Because it is such an important assumption, experience studies generally dedicate a significant portion of the report to analyzing this assumption. There is usually analysis regarding historical inflation and, often, there is analysis about the future outlook for inflation. As part of the salary scale analysis, the experience study report only stated the “wage” inflation assumption with no further analysis. We recommend that the retained actuary provide a thorough analysis of the underlying inflation assumption in future experience study reports.

We have additional comments related to the “wage” inflation and the salary scale assumption. These comments will be discussed in the following sections.

Inflation

Inflation refers to mean price inflation as measured by annual increases in the Consumer Price Index (CPI). This assumption underlies, and is the building block, for most of the other economic assumptions, including the investment return assumption and the assumed rate of salary increases. As such, it is fundamentally important that a consistent inflation assumption is used throughout the assumption review process.

Since 2009, the Board has adopted three revisions to the salary increase assumption. As part of each of these assumption changes, there have been changes to the underlying inflation assumption; however, the details of the changes were not always clearly indicated in the documentation we reviewed. Based on the June 30, 2013 actuarial valuation reports, the retained actuary indicates that "wage" inflation is assumed to be 3.00%. It is unclear whether this "wage" inflation is intended to represent core (price) inflation or something larger than core inflation.

For purposes of our actuarial review, we have assumed that the stated "wage" inflation assumption of 3.00% also represents the assumption for core inflation.

Actual historical increases in CPI have averaged about 2.50% over the last 20 years. Average increases in inflation for the 20 years prior to the year 1990 have averaged much higher than the current assumption. However, since this is a forward-looking assumption, historical experience is not the best measure for predicting future increases in inflation. Rather, there are several sources that provide forward-looking inflation expectations. These sources include the bond market, investment consulting firms, surveys of professional forecasters conducted by the Philadelphia Federal Reserve, and assumptions used by the Chief Actuary at the Social Security Administration for projecting the long-term cost of benefits provided by the Social Security Administration.

These sources show similar inflation expectations. Namely, inflation during the next five years is expected to be lower than long-term inflation expectations. Also, each of these sources is consistent with their long-term inflation expectations, and project inflation for the next 10 to 20 years to range from 2.40% to 2.80% annually.

Taking this information into consideration, we believe the current 3.00% "wage" inflation assumption appears to be reasonable, although as stated above, it is unclear whether it represents price inflation or price inflation plus an additional wage or productivity component.

Investment Return

The investment return assumption is one of the principal assumptions in any actuarial valuation. It is used to discount future expected benefit payments to the valuation date to determine the liabilities of the retirement plan. Even a small change to this assumption can produce significant changes to the liabilities and contribution rates.

The current investment return assumption is 8.00%. We have analyzed the assumption assuming that the assumption is constructed from a 3.00% inflation assumption plus an annual real rate of return of 5.00%, net of investment fees and administrative expenses paid from the trust.

We believe an appropriate approach to reviewing an investment return assumption is to determine the median expected portfolio return given the retirement plan's target allocation and a given set of capital market assumptions. Per the ASRS Strategic Asset Allocation Policy Schematic, approved by the Board of Trustees on May 24, 2013, ASRS's current target asset allocation is:

Asset Class	Target
Large Cap U.S. Equities	23%
Mid Cap U.S. Equities	5%
Small Cap U.S. Equities	5%
Developed Large Cap Non-US Equities	14%
Developed Small Cap Non-US Equities	3%
Emerging Markets Non-US Equities	6%
Private Equity	7%
Core U.S. Fixed Income	13%
High Yield U.S. Fixed Income	5%
Emerging Market Debt	4%
Private Debt	3%
Commodities	4%
Real Estate	8%
Cash	0%
Total	100%

In addition to these allocations, the investment policy allows for a 10% Global Tactical Asset Allocation.

Because GRS does not develop or maintain its own capital market assumptions, we reviewed assumptions developed and published by the following investment consulting firms:

- JP Morgan
- NEPC
- PCA
- Mercer
- RV Kuhns
- Towers Watson
- BNY Mellon
- Hewitt EnnisKnupp

These investment consulting firms issue reports that describe their capital market assumptions, which include their estimates of expected returns, volatility, and correlations. While these assumptions are developed based upon historical analysis, many of these firms also incorporate forward looking adjustments to better reflect near-term expectations.

Given ASRS's current strategic target asset allocation and the investment firms' capital market assumptions for 2013, the development of the average nominal return, net of investment and administrative fees paid from the trust, is provided in the table below:

Investment Consultant	Investment Consultant Expected Nominal Return	Investment Consultant Inflation Assumption	Expected Real Return (2)–(3)	Actuary Inflation Assumption	Expected Nominal Return (4)+(5)	Plan Incurred Expense Assumption	Expected Nominal Return Net of Expenses (6)-(7)		Standard Deviation of Expected Return (1-Year)
(1)	(2)	(3)	(4)	(5)	(6)	(7)	(8)		(9)
1	7.14%	3.00%	4.14%	3.00%	7.14%	0.34%	6.80%		12.50%
2	7.26%	2.40%	4.86%	3.00%	7.86%	0.34%	7.52%		10.70%
3	7.99%	3.00%	4.99%	3.00%	7.99%	0.34%	7.65%		13.10%
4	7.58%	2.50%	5.08%	3.00%	8.08%	0.34%	7.74%		14.70%
5	7.61%	2.50%	5.11%	3.00%	8.11%	0.34%	7.77%		14.20%
6	8.27%	2.51%	5.76%	3.00%	8.76%	0.34%	8.42%		14.70%
7	8.24%	2.30%	5.94%	3.00%	8.94%	0.34%	8.60%		15.10%
8	8.61%	2.50%	6.11%	3.00%	9.11%	0.34%	8.77%		14.40%
Average	**7.84%**	**2.59%**	**5.25%**	**3.00%**	**8.25%**	**0.34%**	**7.91%**		**13.68%**

We determined, for each firm, the expected nominal return rate based on ASRS's target allocation and then subtracted that investment consulting firm's expected inflation to arrive at their expected real return in column (4). Then we added back ASRS's current 3.00% inflation assumption and subtracted an estimated 0.34% for investment fess and administrative expenses (see discussion below) paid from the trust to arrive at an expected nominal return net of expenses. As the table shows, the resulting average arithmetic one-year return of the eight firms is 7.91%. It should be noted that the average administrative and investment expenses for the prior five fiscal years was 0.66%. However, we reduced the offset for the investment expenses related to active management. The reason for the reduced offset is the expectation that the managers will generate enough alpha to at least cover the cost of the active management. No additional alpha for active management is considered.

In addition to examining the expected one-year return, it is important to review anticipated volatility of the investment portfolio and understand the range of long-term net return that could be expected to be produced by the investment portfolio. Therefore, the following table provides the 25th, 50th, and 75th percentiles of the 20-year geometric average of the expected nominal return, net of investment and administrative fees paid from the trust, as well as the probability of exceeding the current 8.00% assumption.

Investment Consultant	Distribution of 20-Year Average Geometric Net Nominal Return 25th	50th	75th	Probability of exceeding 8.00% *
(1)	(2)	(3)	(4)	(5)
1	4.21%	6.06%	7.94%	24.3%
2	5.40%	6.98%	8.59%	33.5%
3	4.91%	6.84%	8.82%	34.6%
4	4.55%	6.72%	8.94%	34.8%
5	4.75%	6.83%	8.96%	35.5%
6	5.25%	7.41%	9.62%	42.9%
7	5.32%	7.54%	9.80%	44.5%
8	5.67%	7.80%	9.97%	47.4%
Average	**5.01%**	**7.02%**	**9.08%**	**37.2%**

*Plan's current return assumption net of expenses.

As the analysis shows, there is a 50% likelihood that the 20-year average net nominal return will be between 5.01% and 9.08%. Under the current Actuarial Standards of Practice No. 27, Selection of Economic Assumptions for Measuring Pension Obligations, this is the best estimate range for a reasonable investment return assumption. Further, while the table above documents that the average probability of exceeding the current 8.00% investment return assumption is only 37.2%, it must be noted that the average duration for these return expectations is short-term in nature (7-10 years). If the capital market assumptions were based on a longer time horizon it would be reasonable to assume that the rate of return expectations would be greater.

As a point of reference, the National Association of State Retirement Administrators published a survey in March 2013 of 126 large public retirement systems which reflects the nominal assumption in use, or announced for use, as of the date of the survey. The average investment return assumption for responding systems was 7.77%.

The current investment return assumption falls within our best-estimate range and we believe that the current 8.00% assumption is reasonable for this purpose.

In September 2013, the Actuarial Standard Board adopted changes to ASOP No. 27 which significantly reduced the reasonable range for an acceptable investment return assumption. The effective date for this new standard is for measurement dates on or after September 30, 2014. While this new standard does not apply to the actuarial valuation that is being audited, ASRS may wish to discuss the possible impact of these changes with their retained actuary.

Earnings Progression

Generally, assumed rates of pay increase are usually constructed as the total of three main components:

- Price Inflation – currently 3.00% (see discussion below)
- Economic Productivity Increases (base pay increases above price inflation) – currently 0.00% (see discussion below)
- Merit, Promotion, and Longevity – This portion of the salary increase assumption reflects components such as promotional increases as well as "step" increases and longevity pay. This portion of the assumption is not related to inflation.

In the context of a typical employer pay scale, pay levels are set for various employment grades, or "steps". In general, this pay scale is adjusted as follows:

- The inflation and economic productivity assumptions, collectively referred to as wage inflation, reflect the overall increases of the entire pay scale, and
- The Merit, Promotion, and Longevity increase assumption reflects movement of members through the pay scale.

In the most recent experience study, the retained actuary proposed a base "wage" inflation of 3.00% plus a merit component that varied based on service. The retained actuary recommended changes to the merit component of the salary scale assumption which, when combined with the changes in the "wage" inflation, resulted in a 25% across the board reduction in the salary increase assumption. As most are aware, during the five year period covered by the experience study, the country suffered through what is generally referred to as the "Great Recession". The Great Recession caused severe financial hardship for many state and municipal governments which was passed onto employees in the form of very small pay increases, reductions in force, and furloughs. Given these financial hardships, it can be very difficult to use the observed salary increases during this period as a basis for setting an assumption for the future.

The retained actuary has experience with ASRS and may have additional information regarding the appropriateness of the long-term expectation for salary increases above inflation. As a result, this comment is not intended to imply that the current assumption is unreasonable, but only that the retained actuary should thoroughly consider the economic cycle during the period being studied and make adjustments if that economic cycle is not expected to continue. We recommend that the retained actuary and the Board closely monitor the salary experience and update the assumption, accordingly, if it appears that salaries are consistently increasing by more than the current assumption anticipates.

Summary

The set of actuarial assumptions and methods, taken in combination, is within the range of reasonableness and generally established in accordance with ASOP No. 27, Selection of Economic Assumptions for Measuring Pension Obligations, and ASOP No. 35, Selection of Demographic and Other Noneconomic Assumptions for Measuring Pension Obligations.

We have the following recommendations regarding the actuarial assumptions:

- In order to improve the overall completeness of the next actuarial experience study report, we recommend the following:
    - The retained actuary should include more detail regarding the "actuals" and "exposures" underlying the assumptions reviewed, and
    - The retained actuary should provide a thorough analysis of the underlying inflation assumption and separately identify price inflation from wage inflation.

- We recommend that the retained actuary modify the simplifying assumption used for the actuarial valuations of active members to assume that the post-retirement mortality assumption will be the mortality assumption for annuitants with benefits greater than $14,400.

- We recommend that in future experience studies the retained actuary considers the impact of retirement incentives on observed retirement rates, both during the year of the retirement incentive as well as the year (or years) following the retirement incentive.

- We recommend that in future experience studies the retained actuary thoroughly considers the economic cycle during the period that the assumptions are being studied and apply the appropriate level of weighting to the experience during the assumption setting process if that economic cycle is not expected to continue.

SECTION IV

ACTUARIAL METHODS

Actuarial Methods

The ultimate cost of the retirement programs administered by ASRS is equal to the benefits paid plus the expenses related to operating ASRS. This cost is funded through contributions to the programs administered by ASRS plus the investment return on accumulated contributions which are not immediately needed to pay benefits or expenses. The projected level and timing of the contributions needed to fund the ultimate cost are determined by the actuarial assumptions, plan provisions, participant characteristics, investment experience, and the actuarial cost method.

Actuarial Cost Methods

An actuarial cost method is a mathematical process for allocating the dollar amount of the total present value of plan benefits (TPV) between future normal costs and actuarial accrued liability (AAL). As prescribed by State statute, the retained actuary uses the Projected Unit Credit actuarial cost method (PUC method), where the TPV for an individual is allocated in proportion to accrued and future service at the valuation date. Essentially, the PUC method recognizes years of service when earned, but projects salary to retirement age. As such, the AAL for an individual member is generally equal to the TPV times the ratio of (i) the number of years of covered service on the date of the actuarial valuation, to (ii) the total expected covered service at retirement. There are varying methods that can be used to determine the proportion of the TPV that will be attributed to the AAL.

The normal cost is generally equal to the increase in the AAL due to one additional year of service in the numerator of the ratio described above. The normal cost under the PUC method increases as a percentage of pay for an individual member from the date of hire to the date of retirement. This differs from the behavior of the normal cost under the Entry Age Normal actuarial cost method (the most widely used actuarial cost method in the public sector) where the normal cost is expected to be level as a percentage of pay.

Although the Entry Age Normal actuarial cost method is the most widely used actuarial cost method in the public sector, the PUC method, used in the actuarial valuation of all three retirement programs administered by ASRS, is still a commonly used method. The PUC method is one of the six currently accepted cost methods under GASB No. 25 and is a reasonable method for ASRS.

The Governmental Accounting Standards Board (GASB) has adopted new accounting standards for Pension Plans (Statements 67 and 68) which will be effective for the June 30, 2014 financial statements of ASRS. These new standards specify that the Entry Age Normal actuarial cost method is the only acceptable method for determining the required GASB disclosures. This requirement does not directly affect the actuarial cost method that is adopted by the Board and used to develop the funding requirements. However, the use of different actuarial cost methods will result in the disclosure of multiple actuarial liabilities (one for funding and one for accounting).

We have reviewed the retained actuary's application of the Projected Unit Credit actuarial cost method and we believe that the method is reasonable and appropriately applied.

Asset Valuation Method

The market value of assets can experience significant short-term swings, which can cause large fluctuations in the development of the actuarially determined contributions required to fund the retirement systems. Thus, many systems use an asset valuation method which dampens these short-term volatilities to achieve more stability in the employer contribution. A good asset valuation method places values on a retirement plan's assets which are related to the current market value, but which will also produce a smoother pattern of costs.

ASOP No. 44, Selection and Use of Asset Valuation Methods for Pension Valuations, provides a framework for the determination of the actuarial value of assets (AVA), emphasizing that the method should: (1) bear a reasonable relationship to the market value of assets (MVA), (2) recognize investment gains and losses over an appropriate time period, and (3) avoid systematic bias that would overstate or understate the AVA in comparison to MVA.

ASRS Plan and LTD Program

The actuarial valuations of the ASRS Plan and the LTD Program currently utilize a smoothed asset valuation method that immediately recognizes income equal to the expected return on market value of assets, based on the assumed valuation interest rate (8.00%). Differences between the assumed investment return and the actual market investment return are recognized over a ten-year period. The 10-year smoothing was implemented as of June 30, 2002 for the ASRS Plan and as of June 30, 2006 for the LTD Program. The AVA is not constrained to be within a "corridor" around the MVA.

We believe that that the asset valuation method for the ASRS Plan and the LTD Program comply with ASOP No. 44. Additionally, the method is reasonable and appropriately applied for the valuation.

ASRS System

The Plan currently uses the MVA as the AVA in the annual valuation (i.e., no smoothing). An actuarial valuation based on the MVA has the advantage of using an asset value that is the same as the amount shown in financial reports. It also eliminates the need to explain the use of an asset value other than market value for making decisions regarding benefit enhancements.

Most importantly, the benefits payable by the ASRS System are intended to change annually (theoretically "up" or "down") with the funded status of the plan. As a result, the use of MVA to determine the annual funded status of the ASRS System is the most appropriate asset method.

We believe that that the asset valuation method for the ASRS System complies with ASOP No. 44. Additionally, the method is reasonable and appropriately applied for the valuation.

Summary

We believe that the actuarial methods are reasonable and appropriately applied. As a result, we have no recommendations regarding the application of the actuarial methods.

SECTION V

FUNDING POLICY AND FINANCIAL OBJECTIVES

Funding Policy and Financial Objectives

In funding defined benefit pension plans, governments must satisfy a range of objectives. In addition to the fundamental objective of funding the long-term costs of promised benefits to plan participants, governments also work to: (1) keep employer's contributions relatively stable from year to year; (2) allocate pension costs to taxpayers on an equitable basis; and (3) manage pension risks.

The actual contribution rates to the ASRS Plan and the LTD Program are actuarially determined contributions such that the actuarial accrued liability is expected to be fully funded at a future date. When contribution rates are actuarially determined, the resulting contribution rate is comprised of two components, a normal cost rate and an amortization percentage. The normal cost rate is the theoretical percentage of pay that would be required to fund the member's benefits that are expected to be earned over the subsequent year if the retirement program's experience exactly followed the actuarial assumptions. The normal cost of the plan is the weighted average cost of providing benefits to all the active members in the retirement program. For the ASRS Plan, the normal cost is expected to gradually decrease in future years as the number of members hired on or after July 1, 2011 (and earning a less valuable benefit) grows.

The amortization amount is the cost of financing the difference between the actuarial accrued liability and the actuarial value of assets. The methods for determining the amortization amount, such as the amortization period, are dictated by the Board's funding policy.

The sum of these two cost components provides the total contribution rate to the ASRS retirement programs. The rates applicable to the employer are the total rates less the member contribution rates.

The Board outlined their financial objectives for the retirement programs when the Board adopted new amortization periods at the November 2013 Board meeting. Specifically, the Board adopted a closed 30-year amortization period with level-dollar payments for the 401(a) portion of the ASRS Plan. Similarly, the Board adopted a closed 15-year amortization period with level-dollar payments for the LTD Program and the 401(h) portion of the ASRS Plan. ASRS does not have formal written funding policies for these programs, but the amortization periods adopted by the Board are the first and most important step of funding the long-term costs of the promised benefits.

Adoption of Formal Written Funding Policy

Developing a written funding policy can help decision-makers understand the tradeoffs involved in reaching these goals and document the reasoning that underlies their decisions. By clarifying the funding policy, decision-makers can come to a better understanding of the principles and practices that produce sustainable benefits.

We recommend that ASRS adopt a formal funding policy. This policy would codify the decisions already made by the Board and the reasons behind the decisions. Additionally, the funding policy can document the steps taken to manage pension risks. In an effort to keep the employer's pension contribution relatively stable from year to year, a funding policy should: (1) identify key risk areas that add to contribution volatility and (2) identify ways to manage each of those risks.

In 2012, GRS published a Research Report titled "Developing a Pension Funding Policy for State and Local Governments." We have included this Report in the Appendix for your reference. This Report provides a framework for developing a robust funding policy.

Financial Objectives

The financial objectives for the ASRS Plan (pension and health benefits) and the LTD Program are to (1) maintain reasonably stable contribution rates, and (2) achieve an ultimate funded status of 100%.

If the participating employers of ASRS adhere to the current funding policy, then we expect the funded ratio to gradually improve and eventually attain a 100% funded ratio. We believe that the Board's funding policy is an appropriate balance of cost stability and maintaining intergenerational equity. This funding policy is also consistent with the principles and objectives recommended by the Government Finance Officers Association (GFOA) in a report they issued in 2013 regarding funding policies for defined benefit plans, as well as the Actuarial Funding Policies for Public Pension and OPEB Plans issued by the Conference of Consulting Actuaries Public Plans Committee in February 2014.

However, there are a few aspects of the current funding policy that should be noted.

Procedures for Calculating Actuarially Determined Contributions

As part of the most recent actuarial experience study, the Board adopted two modifications to the procedures for calculating the actuarially determined contributions.

First, the contribution rates are now calculated based on the assumption that the contributions are paid throughout the fiscal year (previously they were assumed to be paid at the beginning of the fiscal year). We believe that this is a very sound procedure for calculating the contribution rates.

Additionally, the actuarially determined contributions are now reduced by the expected Alternate Contribution for the upcoming year. We believe that this is a reasonable procedure, especially given the magnitude of the historical Alternate Contributions. This offset will be very sensitive to the number of return-to-work retirees and the provisions of the return-to-work program within ASRS. It will be important for the Board and the retained actuary to always consider the possible impact of plan design and demographic changes on this contribution source when projecting future contribution rates.

Contribution Lag

There is a one-year lag between the valuation date and the effective date of the contribution rate. For instance, the actuarial valuation results as of June 30, 2013 are used to calculate the contribution rate necessary to meet the Board's funding policy. However, this contribution rate will not become effective until July 1, 2014. This lag is a common occurrence when retirement programs are funded by actuarially determined contributions so that the retirement system and the employers have time to implement the contribution rate changes in advance of the effective date.

The current procedures produce a small disconnect between the funding policy and the calculation of the necessary contributions by the retained actuary. When the contribution rates are calculated as of June 30, 2013, it is known for certain that the retirement program will receive a different rate of

contribution during the lag period (between the valuation date and the effective date of the contribution). For instance, the June 30, 2013 actuarial valuation indicates that the contribution rate necessary to meet the Board's funding policy must be 22.96% of pay for the ASRS Plan. However, it is known that the contribution rate will only be 22.60% of pay during the lag period from July 1, 2013 through June 30, 2014. As a result, the ASRS plan will receive 0.36% of pay (approximately $31.5 million) less than it needs in order to meet the goals of the Board's funding policy for fiscal year 2014. Even if all actuarial assumptions are met, the future contribution rates will have to increase in order to make up for the $31.5 million contribution shortfall during the lag period.

We believe that the calculated contribution rates would better achieve the Board's funding policy by incorporating the known contribution differences during the lag period. In most years, this proposed change should not have a material impact on the calculated contribution rates. If this updated procedure was adopted for the June 30, 2013 actuarial valuation, the increase in the necessary contributions effective for the fiscal year beginning July 1, 2014 would be approximately $3 million. However, this procedure could have a material impact on the contributions in years in which the retirement program realizes significant changes in the funded status (through actuarial gains/losses, assumption changes, etc).

Normal Cost for New Hires

As part of each actuarial valuation, the retained actuary calculates a normal cost rate that represents the normal cost for the upcoming year, stated as a percentage of pay. This normal cost rate is calculated for the June 30, 2013 actuarial valuations by taking the normal cost for the upcoming year for active members on the valuation date and dividing by the projected payroll for the upcoming year.

It is important to note that the projected payroll for the upcoming year includes the expected pay for the active members on the valuation date as well as the pay for new hires assumed to replace the current active members assumed to leave active service during the upcoming year. We believe that there is a disconnect between the members included in the normal cost calculation (the numerator or the normal cost rate calculation) and the members included in the projected payroll (the denominator).

We believe that this approach understates the normal cost rate.

When the actuarially determined contributions are based on the normal cost rate, as calculated by the retained actuary for the June 30, 2013 actuarial valuation, the contributions received by the retirement program will only be allocated to the normal cost associated with active members on the valuation date. None of the contributions received by the retirement program will be allocated to the normal cost for the new hires during the partial year that they are assumed to accrue benefits.

When no contributions received by the retirement program are allocated to the normal cost for members in their year of hire, then there will be an actuarial loss each year in the actuarial valuation due to new entrants. This new entrant loss can be seen, in part, on Page 31 of the June 30, 2013 actuarial valuation report for the ASRS Plan. Specifically, the actuarial loss for "new entrants/rehires" was $97 million for the prior fiscal year and a total of $401 million for the past five years. It should be noted that, since this actuarial loss also includes the losses associated with rehires, losses strictly associated with new hires should be less. When this new entrant normal cost is incorporated into the actuarial valuation through an actuarial loss, the liability is added to the existing unfunded actuarial

accrued liability and funded over the current amortization period (30 years as of June 30, 2013 for the 401(a) benefits).

It is important to note that the liability associated with the new entrant normal cost will ultimately be included in the actuarial valuation. However, we believe that the most appropriate approach would be to incorporate the new entrant normal cost into the calculation of the normal cost rate for the upcoming year. This approach allocates the cost of new hires to the period where they provided services to taxpayers, prevents the deferral of the costs, and keeps the contribution rates more stable.

The retained actuary could address this disconnect in a number of ways. A few examples are:

- The calculation of the normal cost rate would only include normal cost and projected pay for active members on the valuation date based on a modified projected payroll.
    - Normal Cost (numerator): same normal cost for active members on the valuation date
    - Modified Projected Payroll (denominator): retained actuary would calculate a modified projected payroll only for the active members on the valuation date, which would only include pay for the portion of the year that the active members are assumed to work.
- The calculation of the normal cost rate would include normal cost and projected pay for active members on the valuation date and new entrants based on a modified normal cost.
    - Modified Normal Cost (numerator): retained actuary would develop an estimate for the normal cost of new entrants during the year and add the estimate to the normal cost for the active members on the valuation date
    - Projected Payroll (denominator): same projected payroll for active members on the valuation date and expected new entrants
- The actuarial cost method could be modified such that each member's benefits are attributed over a period that begins with the first valuation that the member is included in the actuarial valuation. In other words, the application of the actuarial cost method would result in a zero accrued liability on the member's first valuation date and a zero normal cost in the first fractional year of a member's participation in the retirement program.

Each of these proposed solutions will increase the resulting normal cost rate, but they will all eliminate the actuarial losses that occur each year as a result of the new entrants.

Financial Objectives of the ASRS System

According to the ASRS System's June 30, 2013 actuarial valuation report, the Arizona Attorney General issued an opinion letter on November 24, 2009 stating that System benefits cannot be "diminished or impaired" as defined under Article 29 of the Arizona Constitution. It is our understanding that the Board has adopted the Attorney General's opinion letter.

Prior to the Attorney General's opinion letter, the provisions of the ASRS System allowed the Board to modify the benefits (up or down) paid by the retirement program in order to maintain a funded status between 95% and 105%.

The only contributions to the ASRS System now are the current 7% of pay contributions (by the employer and the member) for the few remaining active members. If all of the actuarial assumptions are met, the ASRS System will run out of money before all of the benefits are paid. However, assets

are being accumulated in the ASRS Plan to guarantee the benefits of members who retired on or after July 1, 1981 from the ASRS System.

As long as the State continues to guarantee the benefits payable to ASRS System members who retired prior to July 1, 1981, then the objective of paying all promised benefits of the ASRS System is being met. As of June 30, 2013, the benefits payable to ASRS System members who retired prior to July 1, 1981 were underfunded by $68,234.

Summary

We believe that the funding policy is being reasonably applied and the financial objectives of the retirement programs are being met.

We recommend that ASRS Board consider adopting a formal funding policy which would codify the decisions already made by the Board and the reasons behind the decisions. Additionally, the funding policy can document the steps taken to manage pension risks.

We also recommend that the retained actuary discuss with the Board possible adjustments to the contribution calculation that will eliminate the current disconnects resulting from (1) the different contribution rates during the lag period, and (2) the calculation of the normal cost rate. The current approach to calculating funding policy contributions will eventually incorporate these elements. However, we believe that these adjustments will allocate the contributions to the most appropriate period of time.

SECTION VI

ACTUARIAL VALUATION RESULTS

Actuarial Valuation Results

Benefits

Every employer is different and every employer's retirement plan is different. Each employer has a set of workforce and financial needs that dictate the type of retirement benefit that is most appropriate for their employees. Additionally, the amount of resources available to allocate to the retirement plan will dictate the level of benefits provided by the retirement plan. Regardless of the reasons for the benefit design, the employer must understand the liability and contribution requirements associated with the benefits promised. As a result, the actuarial valuation and the resulting funding policy contribution must properly reflect the benefit structure of the retirement plan.

In general, the benefits promised by ASRS through the Plan, the System and the LTD Program were reasonably incorporated in the actuarial valuations of these programs.

Data

As part of our actuarial audit, we received a preliminary set of census data for plan participants and beneficiaries as of June 30, 2013 originally provided by ASRS to the retained actuary for the actuarial valuations. Additionally, we received a final set of census data for plan participants and beneficiaries as of June 30, 2013 used by the retained actuary for the actuarial valuations. Finally, we received a copy of the data questions from the retained actuary with ASRS responses.

We used this data, along with the census summaries included the valuation reports, to review the valuation data process. In addition, we received the retained actuary's procedures for pay smoothing for active members and valuing the deferred vested members.

In total, we believe that the final valuation data used by the retained actuary is reasonable and valid for its purpose.

Actuarial Valuation Results

To verify the accuracy of the retained actuary's valuation results, GRS performed independent valuations, as of June 30, 2013, of the following plans:

- ASRS Plan (pension and health benefits)
- ASRS System (pension and health benefits)
- Long Term Disability Program

The replication valuations were based on the final valuation data provided by the retained actuary. The replication uses the same methods and procedures that were used by the retained actuary. The results show that the retained actuary's numerical results are reproducible within acceptable tolerance ranges.

Generally accepted actuarial standards and practices provide actuaries with the basic mathematics and frameworks for calculating the actuarial results. When it comes to applying those actuarial standards to complex calculations, differences may exist due to individual opinion on the best way to make those complex calculations. This may lead to differences in the calculated results, but these differences

should not be material. Generally, differences in actuarial liabilities of 5% or less are considered within acceptable tolerance ranges.

As the following tables show, our replications of the retained actuary's valuation results are all less than 2%. As a result, we believe that the actuarial accrued liabilities presented in the retained actuary's valuation reports provide a reasonable representation of the actuarial accrued liability based on the stated assumptions, methods and procedures.

	GRS REPLICATION			FINAL JUNE 30, 2013 VALUATION		
	401(a) Account	401(h) Account	Total	401(a) Account	401(h) Account	Total
Total Present Value of Benefits						
Active Members	22,986,625,643	820,713,859	23,807,339,502	22,890,415,225	828,368,548	23,718,783,773
Inactive Members	1,562,656,891	47,029,537	1,609,686,428	1,613,619,133	47,018,704	1,660,637,837
Retired Members and Beneficiaries	22,417,092,986	702,297,782	23,119,390,768	22,398,414,156	694,187,656	23,092,601,812
Disabled Members*	872,528,460	38,906,473	911,434,933	871,779,172	38,925,197	910,704,369
Other-Than-Plan Members	1,578,432	5,224,216	6,802,648	1,650,427	5,618,364	7,268,791
Post-1981 System Members	412,704,278	0	412,704,278	412,582,843	0	412,582,843
TOTAL	48,253,186,690	1,614,171,867	49,867,358,557	48,188,460,956	1,614,118,469	49,802,579,425
Difference	*0.1%*	*0.0%*	*0.1%*			
Actuarial Accrued Liability						
Active Members	14,659,399,217	693,792,699	15,353,191,916	14,613,709,501	699,070,334	15,312,779,835
Inactive Members	1,562,656,891	47,029,537	1,609,686,428	1,613,619,133	47,018,704	1,660,637,837
Retired Members and Beneficiaries	22,417,092,986	702,297,782	23,119,390,768	22,398,414,156	694,187,656	23,092,601,812
Disabled Members*	872,528,460	38,906,473	911,434,933	871,779,172	38,925,197	910,704,369
Other-Than-Plan Members	1,578,432	5,224,216	6,802,648	1,650,427	5,618,364	7,268,791
Post-1981 System Members	412,704,278	0	412,704,278	412,582,843	0	412,582,843
TOTAL	39,925,960,264	1,487,250,707	41,413,210,971	39,911,755,232	1,484,820,255	41,396,575,487
Difference	*0.0%*	*0.2%*	*0.0%*			
Normal Cost (beginning of year)	1,104,383,373	32,172,038	1,136,555,411	1,099,143,459	32,745,588	1,131,889,047
Difference	*0.5%*	*-1.8%*	*0.4%*			

* Includes disabled members currently receiving of benefits from the Plan as well as disabled members currently receiving benefits from the LTD Program and eligible for deferred benefits from the Plan.

	GRS REPLICATION	FINAL JUNE 30, 2013 VALUATION
	System Valuation	
Actuarial Accrued Liability		
Active Members	17,413,339	17,413,339
Inactive Members	12,675,602	12,675,602
Non-Members	3,294,486	3,294,486
Retirees**	399,648,020	399,517,054
TOTAL	433,031,447	432,900,481
Difference	*0.0%*	
	LTD Program	
Actuarial Accrued Liability		
Active Members***	129,989,928	132,870,587
LTD Retirees	199,170,325	199,726,230
TOTAL	329,160,253	332,596,817
Difference	*-1.0%*	
Normal Cost (beginning of year)	15,256,352	15,312,600
Difference	*-0.4%*	

** Includes liability for benefits guaranteed by the State and by the Plan.
*** Includes liability for IBNR.

As part of our replication valuation, GRS requested sample participant calculations from the retained actuary to ensure that the retained actuary valued the correct benefit levels, used the correct assumptions, and calculated the liabilities correctly on an individual basis. The requested sample participants included active and inactive members from the ASRS Plan, ASRS System and the LTD Program.

There are a few issues that were discovered during the replication process and subsequent review of the sample participants. These issues will be discussed below.

Active Members. At the onset of the review, we requested that the retained actuary provide sample liability calculations for active members in the ASRS Plan, ASRS System and the LTD Program. The retained actuary provided enough detail to show probabilities of decrement by age, estimated pay and benefits by age, and values of benefits or pay by age for each decrement in sufficient detail to verify the calculation of the present value of benefits, present value of pay, accrued liability and normal cost for the sample calculations requested.

We have previously noted our comments on the application of the actuarial cost method (Section IV) and the actuarial assumptions (Section III). We identified one additional element of the actuarial valuation of active members in the ASRS Plan that the retained actuary should consider for future actuarial valuations.

> *Actual Pay History* – The retained actuary receives five years of historical salary from ASRS each year as part of the actuarial valuation process. The retained actuary uses the prior two years of actual pay to calculate a "smoothed average pay" that is used to project a member's pay into the future. However, the retained actuary does not use the actual historical pay to calculate a member's current final average pay. The use of historical pay would only have an

impact on the projected benefits payable to members that are assumed to terminate with a vested benefit or retire over the first few years following the valuation date. In most cases, after the first few years following the valuation date, the member's actual historical pay would not factor in to the calculation of the member's projected benefits.

It is not uncommon to disregard the actual pay history when performing an actuarial valuation, but the use of actual pay history has become more notable since the recent recession and resulting flat salaries. We recommend that the retained actuary consider the use of actual pay history in the calculation of a member's final average salary.

We do not believe that this change will have a material impact on the actual valuation but we believe this approach would make better use of the data elements provided by ASRS.

Based on our review of the other aspects of the actuarial valuation, the liability determination of active participants was reasonable and appropriately determined for the ASRS Plan, the ASRS System and the LTD Program.

Inactive Members. At the onset of the review, we requested that the retained actuary provide sample liability calculations for inactive members that are due a benefit from the ASRS Plan and the ASRS System. The retained actuary provided enough detail to verify the liability amount, benefit amount, form of benefit, age of participant, and age of beneficiary (where applicable) for the sample calculations requested.

Based on our review, the liability determination of inactive members in the ASRS Plan and the ASRS System was reasonable and consistent with the stated assumptions and methods.

Annuitants. At the onset of the review, we requested that the retained actuary provide sample liability calculations for members currently receiving benefits in the ASRS Plan, ASRS System, and the LTD Program. The retained actuary provided enough detail to verify the liability amount, benefit amount, form of benefit, age of participant, and age of beneficiary (where applicable) for the sample calculations requested.

We identified a few elements of the actuarial valuation of annuitants in the ASRS Plan that the retained should update for future actuarial valuations.

Pension Benefits Payable to Other-than-Plan Retirees – We reviewed one sample life where the liability of a 99-year-old retiree was being calculated based on a life annuity where the first three years were guaranteed (immediate 3-year certain-and-life payment form). The retained actuary confirmed that the annuitant should not have been valued with guaranteed payments since the member had been retired for more than three years. Additionally, the retained actuary reviewed their valuation for the remainder of this group and confirmed that updating the actuarial valuation for this entire group would result in a $77,210 decrease to the Other-than-Plan pension liabilities.

Health Benefits Payable to Other-than-Plan Retirees – We reviewed one sample life where the liability of an annuitant was calculated based on an actuarial valuation date of June 30, 2012. The retained actuary confirmed that the annuitant was valued with an incorrect valuation date. Additionally, the retained actuary reviewed their valuation for the remainder of this group and

confirmed that updating the actuarial valuation for this entire group would result in a $193,529 decrease to the Other-than-Plan health benefit liabilities.

As indicated, the impact of these annuitant changes on the actuarial valuation is not significant but they should be corrected for future actuarial valuations. Based on our review of the other aspects of the actuarial valuation, the liability determination of annuitants was reasonable and appropriately determined for the ASRS Plan, the ASRS System and the LTD Program.

Summary

We believe that the actuarial valuation results were developed in a reasonable manner. In the next actuarial valuation, we recommend that the retained actuary incorporate actual pay history into their valuation of active participants and update the actuarial valuation of the Other-than-Plan retirees.

SECTION VII

CONTENT OF THE VALUATION REPORT

Content of the Valuation Report

ASOP No. 4, Measuring Pension Obligations and Determining Pension Plan Costs, provides guidance for performing actuarial valuations of pension plans, and ASOP No. 41, Actuarial Communications, provides guidance for communicating the results. These Standards of Practice list specific elements to be included, either directly or by references to prior communication, in pension actuarial communications. The pertinent items that should be included in an actuarial valuation report on a pension plan should include:

- The name of the person or firm retaining the actuary and the purposes that the communication is intended to serve.
- A statement as to the effective date of the calculations, the date as of which the participant and financial information were compiled, and the sources and adequacy of such information.
- An outline of the benefits being discussed or valued and of any significant benefits not included in the actuarial determinations.
- A summary of the participant information, separated into significant categories such as active, retired, and terminated with future benefits payable. Actuaries are encouraged to include a detailed display of the characteristics of each category and reconciliation with prior reported data.
- A description of the actuarial assumptions, the cost method and the asset valuation method used. Changes in assumptions and methods from those used in previous communications should be stated and their effects noted. If the actuary expects that the long-term trend of costs resulting from the continued use of present assumptions and methods would result in a significantly increased or decreased cost basis, this should also be communicated.
- A summary of asset information and derivation of the actuarial value of assets. Actuaries are encouraged to include an asset summary by category of investment and reconciliation with prior reported assets showing total contributions, benefits, investment return, and any other reconciliation items.
- A statement of the findings, conclusions, or recommendations necessary to satisfy the purpose of the communication and a summary of the actuarial determinations upon which these are based. The communication should include applicable actuarial information regarding financial reporting. Actuaries are encouraged to include derivation of the items underlying these actuarial determinations.
- A disclosure of any facts which, if not disclosed, might reasonably be expected to lead to an incomplete understanding of the communication.
- Cautions about any risk or uncertainty in the results of the actuarial valuation.

Our review of actuarial valuation reports includes the June 30, 2013 valuation report for the ASRS Plan, the ASRS System, and the LTD Program. The actuarial valuation reports complied with the applicable Actuarial Standards of Practice and thoroughly communicated the assumptions, methods and plan provisions incorporated into the June 30, 2013 actuarial valuations. The communication of the actuarial valuation results was well organized and provided stakeholders sufficient information to understand how the contribution rates were calculated.

We have noted a few modifications to the ASRS Plan actuarial valuation report that would allow the report to better comply with ASOP Nos. 4 and 41 as well as to more clearly communicate the components of the actuarial valuation.

Actuarial Disclosures

ASOP No. 41 indicates that "the actuary should consider what cautions regarding possible uncertainty or risk in any results should be included in the actuarial report." The actuarial valuation reports for the ASRS System and the LTD Program include the following statement:

> *Future actuarial measurements may differ significantly from current measurements due to plan experience differing from that anticipated by the economic and demographic assumptions, increases or decreases expected as part of the natural operation of the methodology used for those measurements, and changes in plan provisions or applicable law. Due to the limited scope of this report, Buck performed no analysis on the potential range of such future measurements.*

We would recommend that the retained actuary incorporate a similar statement into the ASRS Plan actuarial valuation report in order to address the risk and uncertainty and to better comply with ASOP No. 41.

References to Disabled Members throughout the Actuarial Valuation Report

There are two distinct groups of disabled members that participate in the ASRS Plan. These two groups are:

- Disabled members that are currently receiving benefits from the LTD Program and are eligible for a deferred benefit from the ASRS Plan, and
- Disabled members that are currently receiving an annuity from the ASRS Plan.

The references to these groups (whether they are separate or combined) are not consistent throughout the actuarial valuation report. We recommend that the retained actuary review all of the references in the actuarial valuation report to either (or both) of these groups and ensure that the groups are referenced in a consistent manner throughout the report.

Section 8, GASB Disclosure and CAFR Information

On page 42, as part of the Actuarial Certification, the actuarial valuation report states: "The funding method is the projected unit-credit method as prescribed in Arizona Revised Statutes Section 38.757A."

We believe that this statement would be more appropriate stated similar to the following: "The funding method is the projected unit-credit method as prescribed in Arizona Revised Statutes Section 38-737."

Section 9, Summary of Actuarial Methods and Assumptions

The presentation of actuarial methods and assumptions is generally complete and understandable. The methods described in this section are reasonable and appropriate for public retirement plans.

We do have the following suggestions to improve the overall communication of the valuation methods and assumptions.

Post-Retirement Mortality for Active Members – The healthy post-retirement mortality assumption is dependent on the amount of the annual benefit payable to the member. For active members, the retained actuary incorporates a simplifying assumption that applies the healthy post-retirement mortality assumption "with no adjustments for small or large benefits" to all future termination and retirement annuity benefits. It would improve the overall communication of mortality assumption in the actuarial valuation report if the retained actuary disclosed this simplifying assumption.

Post-Retirement Assumption for Other-than-Plan Retirees – Other-than-Plan Retirees are receiving historical COLA increases and health supplements from the ASRS Plan while also receiving their primary benefit from the ASRS System. The "benefit category" for post-retirement mortality purposes for this group is based on the sum of all pension benefits payable to these members from the ASRS System and the ASRS Plan. It would improve the overall communication of mortality assumption in the actuarial valuation report if the retained actuary clarified how the "benefit category" was determined for this group.

Actuarial Value of Assets – Since the ASRS Plan guarantees a portion of ASRS System benefits, a corresponding portion of the ASRS System liabilities and assets are included in the actuarial valuation (and resulting contribution calculation) for the ASRS Plan. The valuation reports for the ASRS Plan and the ASRS System both clearly indicate the market value of assets that are attributable to the ASRS System benefits guaranteed by the ASRS Plan. The actuarial valuation of the ASRS Plan also includes a separate actuarial value of assets that is associated with these assets from the ASRS System. However, the actuarial valuation report for the ASRS System only provides the market value of assets. According to the retained actuary, the same 10-year smoothing method is applied to the assets in the ASRS System and a corresponding portion of the resulting actuarial value of assets is included in the actuarial valuation for the ASRS Plan. We recommend that the retained actuary include a description in the actuarial valuation report of the ASRS Plan of how the actuarial value of assets attributable to the ASRS System benefits guaranteed by the ASRS Plan are determined. To be completely thorough, the retained actuary could also consider showing the derivation of the actuarial value of assets for the ASRS System.

Section 11, Plan Provisions

The presentation of the major plan provisions is generally complete and understandable. We do have the following suggestion to improve the overall communication of the plan provisions.

Pre-Retirement Death Benefits – The plan provisions in the valuation report make it clear that the Board reduced the interest rate to be credited on the withdrawal of contributions from 8% to 4%, effective June 30, 2005, and from 4% to 2%, effective June 30, 2013. However, the description of the Pre-Retirement Death Benefits should indicate that the interest rate credited on the balances paid to the beneficiaries of a pre-retirement death remained at 8%.

Summary

In general, the actuarial valuation reports complied with the applicable Actuarial Standards of Practice and thoroughly communicated the assumptions, methods and plan provisions incorporated into the June 30, 2013 actuarial valuations. In order to improve the overall ability of the reports to communicate these items, we recommend that the retained actuary incorporate the noted enhancements into future actuarial valuation reports.

SECTION VIII

ASRS PLAN DESIGN FEATURES

ASRS Plan Design Features

In November 2013, the results of the most recent Public Fund Survey were published. The Survey includes 126 of the nation's largest public retirement systems and is sponsored by the National Association of State Retirement Administrators and the National Council on Teacher Retirement.

We screened the survey data to identify retirement systems that were comparable to ASRS. Through this screening, we identified 10 statewide retirement systems (including ASRS) that cover general employees and teachers but do not cover public safety employees. These 10 retirement systems are scattered across the country, but three of the retirement systems (Colorado, Utah and Nevada) are in close proximity to Arizona.

The following tables will summarize the survey data for these 10 retirement systems. The responses for these 10 retirement systems are based on the results of their actuarial valuations for fiscal years ending in 2012.

Retirement Eligibility

Plan Name	Normal Retirement (age/svc)	Early Retirement (age/svc)
Arizona SRS	65/any, 62/10, Rule of 80; Rule of 85 for new hires after 6/30/11	50/5
Colorado State	65/5; hired before 7/1/05: 50/30, Rule of 80 w/min age 55; hired 7/1/05-12/31/06: any/35, Rule of 80	60/5, 55/20, 50/25
Delaware State Employees	62/5, 60/15, any/30; 65/10, 60/20, any/30 for employees hired after December 31, 2011	55/15, any/25
Kansas PERS	65/any, 62/10, Rule of 85; 65/5, 60/30 for those hired after 6/30/09	55/10
Mississippi PERS	60/4, any/25; 60/8 for those hired after 6/30/07; age 65/4, any/30 for employees hired after June 30, 2011	60/4 for employees hired after June 30, 2011
Nevada Regular Employees	65/5, 60/10, any/30; for new hires on or after 1/1/10: 65/5, 62/10, any/30	Participants may retire at any time once vested
Rhode Island ERS	Varies based on date of hire and retirement eligibility as of 9/30/09 and 7/1/12, new EEs are SSNRA/5	55/20
South Carolina RS	65/5, any/28; 65/8, Rule of 90 for employees hired after June 30, 2012	60/5, 55/25
Utah Noncontributory	any/30, 65/4; any/35 for new hires after 6-30-2012	any/25, 60/20, 62/10
Virginia Retirement System	65/5, 50/30; Rule of 90 for employees hired after June 30, 2010	50/10, 55/5; 60/5 for employees hired after June 30, 2010

ASRS has very similar Normal Retirement eligibility provisions to the entire comparison group. However, ASRS does have one of the more permissive Early Retirement eligibility provisions of the comparison group. Early Retirement at age 50, with five years of service, is a reasonable plan design feature, but it does stand out within this comparison group.

It should be noted that Nevada allows a terminated vested member to commence their benefit at any age with a 4% reduction in their accrued benefit for every year the member commences prior to their unreduced retirement age.

Benefit Determination

Plan Name	Benefit Multiplier	Post-Retirement Increase Provisions	Social Security
Arizona SRS	2.1% for first 20 years, 2.15% for 20 to 25 years, 2.2% for 25 to 30 years, and 2.3% for 30 or more years	Based on excess earnings above 8%, up to 4% annually	Yes
Colorado State	2.50%	Varies by date of retirement; automatic, generally, CPI up to 2%, compounded	No
Delaware State Employees	1.85%	Ad hoc as approved by the general assembly	Yes
Kansas PERS	1.75%	Ad hoc as approved by the legislature	Yes
Mississippi PERS	2.0% for the first 25 years and 2.5% for each year thereafter	Automatic 3%, simple, until age 55, then compounded thereafter. For new hires after June 2011, onset of compounding is delayed until age 60.	Yes
Nevada Regular Employees	2.5%, and 2.67% for svc earned after 7/1/01; for those hired on or after 1/1/10, 2.5%	After 3 years of receiving benefits, auto 2% annually, rising gradually to 5% annually, compounded, after 14 years of receiving benefits; COLA capped at 4% for employee hired on or after 1/1/2010	No
Rhode Island ERS	Varies based on dates of hire and retirement eligibility. For unvested (10 yrs) participants as of 7/1/05: 1.6% for first 10 yrs, 1.8% for yrs 11-20, 2.25% for yrs 21-26, 2.5% for yrs 26-30. New hybrid, effective 7/1/12, includes DB multiplier of 1.0%	Effective 7/1/12, risk-adjusted COLA targeting 2% annually, compounded. 5-year smoothed investment return less 5.5% with a 0% floor and 4% cap	Yes
South Carolina RS	1.82%	Lesser of one percent or $500	Yes
Utah Noncontributory	2.00%; 1.75% for employees hired after June 30, 2011	For those hired before 7/1/11, automatic based on CPI up to 4%, simple. For those hired after 6/30/11, based on CPI to to 2.5%, simple.	Yes
Virginia Retirement System	1.70%; 1.65% for members not vested as of 1/1/2013	Automatic based on CPI up to 5%; 3% max for non-vested members as of 1/1/13	Yes

Amongst this comparison group, ASRS has the third-highest benefit multiplier. However, it should be noted that the members in the two retirement systems with higher benefit multipliers (Colorado and Nevada) are not covered by Social Security.

It is important to be aware of the membership's Social Security coverage when plan design features of two different retirement systems are being compared. The benefits paid by retirement systems, where their membership is also covered by Social Security, are not generally impacted by the Social Security Benefits. However, Social Security coverage means that the member and the employer are each contributing an additional 6.2% of pay to the Social Security Administration. These members will receive additional benefits in retirement, beyond the benefits payable by the retirement systems.

Contribution Rates

Plan Name	Employee Contribution Rate	Employer Contribution Rate	For FY Ended
Arizona SRS	10.74%	10.11%, plus 0.63% for the retiree health care benefit	6/30/2012
Colorado State	8.00%	15.65%	12/31/2012
Delaware State Employees	3.0% of earnings above $6,000; 5% of earnings above $6,000 for those hired after 2011	7.84%	6/30/2012
Kansas PERS	4.0% or 7.0%, depending on employee election	8.77% for state and school; 7.34% for local governments	6/30/2012
Mississippi PERS	9.00%	12.93%	6/30/2012
Nevada Regular Employees	12.25%, paid by employers for most members as a pre-tax cost-sharing plan, in lieu of salary increases or by salary reduction as certified by employers.	12.25%, paid by employers for most members as a pre-tax cost-sharing plan, in lieu of salary increases or by salary reduction as certified by employers.	6/30/2012
Rhode Island ERS	8.75% for state employees, 9.5% for teachers	22.98% for state employees; 22.32% for teachers	6/30/2012
South Carolina RS	6.50%	10.73%	6/30/2012
Utah Noncontributory	Non-contributory; those hired after 6/30/11 must pay any required contribution above the employer's statutory maximum contribution rate of 10%	16.04% to 18.76%; 17.38% as a weighted average	06/13/2013
Virginia Retirement System	5.00%	Rates vary by employer, with a weighted average of approximately 7%. School divisions and political subdivisions may elect to pick up the 5.00% member contribution on behalf of their employees.	6/30/2012

Even though ASRS has the third-highest benefit multiplier amongst this comparison group, the employer contribution rate and the total contribution rate are close to the middle of the comparison group. However, that member contribution rate is the second largest within this comparison group.

It should be noted that differences in actuarial assumptions, in addition to differences in plan design features, can impact the contribution rates.

Summary

Based on a comparison of 10 statewide public retirement systems with similar membership characteristics, ASRS has one of the larger benefit multipliers but only an average employer contribution rate. When comparing plan design features, it is important to keep in mind that the members of ASRS are also covered by Social Security.

SECTION IX

FINAL REMARKS

Final Remarks

The auditing actuarial firm, Gabriel, Roeder, Smith & Company (GRS), is independent of the retained actuarial firm. The auditing actuaries are not aware of any conflict of interest that would impair the objectivity of this work.

We have presented many suggestions for areas where we believe the product can be improved. The retained actuary has access to information and a long history of retirement plans similar to ASRS. We understand that the retained actuary may agree with some of our recommendations, while rejecting others. We ask that the retained actuary and ASRS consider our recommendations carefully. We hope that the retained actuary and ASRS find these suggestions useful.

APPENDIX

GRS RESEARCH REPORT

GRS
Gabriel Roeder Smith & Company
Research Report

Developing a Pension Funding Policy for State and Local Governments

By David Kausch and Paul Zorn[1]

Over the past decade, the Annual Required Contribution (ARC) as described in the Governmental Accounting Standards Board's (GASB's) Statements No. 25 and No. 27 has become a de facto funding policy for many public-sector retirement systems. The GASB is currently revising public pension accounting standards and has communicated an important message in the process: accounting standards are not funding standards. In the Exposure Drafts (EDs) of the new Statements No. 25 and No. 27, the GASB has removed all references to the ARC. At the same time, the EDs require disclosure of elements of a plan's funding policy and the actual funding pattern must be taken into account to determine the plan's financial disclosures. Now more than ever, public retirement systems need to have a sound, written funding policy to secure member benefits – and a strong funding policy may improve a plan's financial disclosures as well.

Funding Policy Goals

The idea of having a written funding policy is not new. In its Best Practice, "Sustainable Funding Practices of Defined Benefit Pension Plans," the Government Finance Officers Association (GFOA) states that the main financial objective of public employee defined benefit plans is to fund the long-term costs of promised benefits to plan participants.[2] Moreover, the GFOA recommends that this be done through a systematic and disciplined accumulation of resources (i.e., contributions and related investment earnings) which are sufficient to the pay promised benefits to plan members over their lifetimes.

In addition to this objective, the GFOA's Best Practice cites other goals as well. To be consistent with the governmental budgeting process, efforts should be made to keep the employer's pension contributions relatively stable from year to year. Moreover, to satisfy the principle of intergenerational equity, pension costs should be allocated to taxpayers on an equitable basis over time, i.e., not pushed into the future or immediately imposed on current taxpayers. In addition, to help offset related risks, efforts may be made to provide a reasonable margin for adverse experience. Developing a written funding policy can help decision-makers understand the tradeoffs related to reaching these goals and document the reasoning that underlies their decisions. By clarifying the funding policy, decision-makers can come to a better understanding of the principles and practices that help sustain benefits over the long-term.

Risk-Management Framework

These funding principles can be thought of in a risk-management framework. In an effort to keep the employer's pension contribution relatively stable from year to year, a funding policy should: (1) identify key

[1] David Kausch is chief actuary for GRS and Paul Zorn is director of governmental research. The authors thank Brian Murphy, Theora Braccialarghe, Supriya Kopf, Lewis Ward, Danny White, Dana Woolfrey and Mary Ann Vitale at GRS for their thoughtful comments. However, the authors retain full responsibility for the accuracy of the information. Moreover, the views expressed do not necessarily represent those of GRS as an organization.
[2] Government Finance Officers Association, "Sustainable Funding Practices for Defined Benefit Pension Plans," 2009.

 © 2012 - Gabriel Roeder Smith & Company

risk areas that add to contribution volatility and (2) identify ways to manage each of those risks. The primary risk areas in funding retirement systems are investment risks, demographic risks within the covered population, benefit or plan design risks, and governance risks. In response to this:

- Investment risks can be managed with diversification of asset classes and asset smoothing.
- Demographic risks can be measured and managed through the use of regular actuarial valuations and actuarial experience studies.
- Benefit or plan design risks are often outside the purview of a retirement system's board, but may include setting the interest rate on member contributions and deciding when to provide ad-hoc COLAs or thirteenth checks.
- Governance risks can be managed with clear policies and controls regarding the major administrative practices of the retirement system.

A written funding policy addresses all of these risks and recognizes tradeoffs between mitigating contribution volatility and recognizing gains and losses over a reasonable period. To help decide these tradeoffs and document the reasoning behind the decisions, the GFOA's Best Practice recommends that plans adopt a written pension funding policy describing the principles and practices that guide the funding decisions. These would include: (1) the reasons for selecting the actuarial methods and assumptions, and (2) the policies related to risk sharing and responding to changes in plan experience. Key elements of a funding policy include decisions related to:

- Actuarial cost method and assumptions
- Asset valuation method
- Amortization method
- Funding target
- Risk management regarding:
    - Frequency of actuarial valuations,
    - Process for reviewing and updating actuarial assumptions,
    - Responding to legislative proposals and changes,
    - Responding to favorable/unfavorable investment experience,
    - Sensitivity analysis and forecasting, and
    - Asset/Liability modeling.

Elements to Consider in Developing a Funding Policy

Actuarial Cost Method

Different actuarial cost methods produce different patterns of normal costs and actuarial accrued liabilities. Some actuarial cost methods are more useful for determining contributions to an ongoing plan, and some are more useful for closed plans. While a detailed description of each cost method is beyond the scope of this report, the following three methods illustrate key distinctions. A more detailed discussion of actuarial cost methods is presented in Appendix A.

- Traditional Unit Credit (TUC) –Under this actuarial cost method, the normal cost for a given year reflects the increase in the benefit earned due to increases in service and salary for the year, but not to service and salary projected to be earned in future years. Generally, this method is not used to fund ongoing public pension plans.
- Projected Unit Credit (PUC) – Under this method, normal cost is calculated using benefits based on increases in service for the year, but with salary projected to the retirement date. This method is used by about 10% of public pension plans.

- Entry Age Normal (EAN) – Under this method, normal cost is calculated using benefits based on projected service and salary at retirement and is allocated over an individual's career as a level percent of payroll. This method is used by about 75% of public pension plans.

Funding policy issues related to the actuarial cost method include:

- Is the cost method appropriate for the plan?
- Does the cost method produce normal costs that are reasonably stable and therefore consistent with the government's budgeting process?

For ongoing plans, the popularity of the EAN cost method is not surprising given governments' need to limit volatility in contribution rates. Moreover, since contribution rates are initially higher under the EAN method than other cost methods, the EAN method accumulates assets more quickly than the other methods. As a result, the assets can be invested earlier to help offset future contributions. By contrast, the TUC and PUC methods start with lower contributions which increase over time.

For closed plans, other actuarial cost methods may be more appropriate. The lack of new entrants into the plan and the shorter service lives of the remaining active members may make it appropriate to fund the plan more rapidly than under the EAN method. This could be done using the Aggregate actuarial cost method. The Aggregate cost method allocates the difference between the value of benefits and assets over the future service of the closed active population as a level percent of payroll.

Actuarial Assumptions

Actuarial assumptions also play a key role in determining the plan's normal costs and actuarial accrued liabilities. The assumptions can be categorized into two groups: (1) economic assumptions (including inflation, wage growth, and long-term expected investment returns); and (2) demographic assumptions (including rates of mortality, disability, retirement, and termination). All assumptions should be consistent with Actuarial Standards of Practice and reflect professional judgment regarding future outcomes.

Although all assumptions are important, the investment return assumption plays an extremely important role in the actuarial valuation, and strongly influences the calculations of normal costs and actuarial accrued liabilities. For funding purposes, the Actuarial Standards Board's Actuarial Standards of Practice (ASOP) No. 27 supports the use of discount rates based on the plan's long-term expected investment return.[3] Funding policy issues related to the discount rate include:

- Does the long-term expected investment return accurately reflect likely investment returns?
- What variations in the actual investment return will likely occur over the long-term?

In order for the actuarial valuation to properly fund the benefits, it is important that the discount rate accurately reflect the long-term investment return. If the assumption is too high, the contributions and actuarial liabilities determined by the valuation will be too low. If the assumption is too low, the contributions and actuarial liabilities will be too high. It is also important to understand that the assumption is intended to reflect an average expected return. In given years, actual returns will vary from the expected return.

[3] Actuarial Standards Board, ASOP No. 27, *Selection of Economic Assumptions for Measuring Pension Obligations*, May 2011.

Asset Valuation Method

The actuarial methods that are used to determine the plan's actuarial value of assets (AVA) also play a role in the funding policy. The difference between the actuarial accrued liability (AAL) and the AVA is the plan's unfunded accrued liability (UAL). To the extent that the plan has a UAL, it must be amortized and included in the contribution rate. Key funding policy issues related to asset valuations include:

- Should the actuarial value of assets be smoothed? If so, over what period?
- Should a corridor be applied to the smoothed value of assets to prevent it from diverging too far from the market value?

Smoothed vs. Market Value of Assets. Investment gains and losses are often "smoothed" into the AVA in order to mitigate the impact of investment volatility on employer contributions. In many cases, this is done by taking the difference between the actual annual investment earnings and the expected annual investment earnings and recognizing a portion of that difference each year over a set number of years. This evens out the impact of investment gains and losses that would otherwise be immediately recognized in the UAL.

Smoothing Period. In cases where assets are smoothed, the smoothing period is often 5 years, although some plans use shorter or longer periods. While the smoothing period for governmental plans is not limited by federal laws or regulations, the Actuarial Standards Board has set out principles for asset smoothing in ASOP No. 44.[4] Under these principles, when a smoothed asset valuation method is used, the actuary should select a method so that:

- The smoothed asset values fall within a reasonable range of the corresponding market values; and
- Any differences between the actuarial value and market value of assets should be recognized within a reasonable period.

Asset Corridors. To satisfy these principles, many plans that smooth assets over periods longer than 5 years also include corridors that limit the extent to which the smoothed value of assets can diverge from the market value. Appendix B provides an illustration of how asset smoothing and asset corridors interact.

Amortization Method

In addition to the normal cost, the other major component of the annual contribution is the portion needed to amortize the UAL. Consequently, when setting the funding policy, the structure of the amortization payments and the length of the amortization period are important issues. It should also be noted that during the amortization period, interest accrues on the outstanding UAL at a rate reflecting the long-term expected investment return. In setting up an amortization policy, the following decisions should be made:

- Should the amortization period be open or closed?
- Should the amortization be on a level-dollar basis or a level-percent-of-pay basis?
- What should be the length of the amortization period?
- Should there be separate amortization bases for annual gains/losses, benefit changes, and other components of the UAL?

A key issue in setting the amortization policy is the possibility of negative amortization. This occurs when the amortization payments are less than the interest accrued on the UAL during the year, and so the outstanding UAL increases rather than decreases. However, this depends on the length of the amortization period, as well as assumptions related to expected investment return and payroll growth. It is important to

[4] Actuarial Standards Board, ASOP No. 44, *Selection and Use of Asset Valuation Methods for Pension Valuations*, May 2011.

note that while the UAL increases when there is negative amortization, it is typically not expected to increase faster than the projected rate of payroll growth and is expected to be fully paid by the end of the period. However, an open amortization period which allows negative amortization may be inconsistent with reaching a funding target of 100% in a reasonable period of time.

Closed Amortization vs. Open Amortization. Another issue is whether the UAL should be amortized over a closed amortization period or an open amortization period. If a closed amortization period is used, the UAL will be fully paid by the end of the period. By contrast, under an open amortization period, the period is reset each year. For example, under a 25-year open amortization period, the UAL is refinanced each year over a new 25-year period.

Closed amortization periods pay down the UAL more rapidly and limit negative amortization, but produce more volatility in the contribution rate as the period gets shorter. An open period results in a more gradual decline of the UAL and helps to control volatility in the contribution rate, but takes substantially longer to pay down the UAL. Moreover, an open amortization period is more likely to produce negative amortization, at least when the period is 15 to 20 years or longer. Appendix C provides illustrations of the amortization patterns under closed and open amortization periods.

Level-dollar vs. Level-percent-of-pay. Another issue is whether the UAL should be amortized on a level-dollar basis or as a level-percent-of-pay. Level-dollar amortization is similar to a fixed-rate home mortgage with a constant dollar payment. Level-percent-of-pay amortization initially has lower dollar payments, but these increase each year. Since level-dollar amortization pays a greater portion of the UAL in earlier years, it is more conservative than level-percent-of-pay amortization. However, level-percent-of pay-amortization may be more consistent with the budgeting process of most governmental entities.

Length of the Amortization Period. Generally, for public pension plans, amortization periods range from 15 to 30 years, although some plans use shorter or longer periods. Shorter amortization periods result in the UAL being paid off sooner, but require higher and likely more volatile contributions. Longer amortization periods require lower contributions, but may shift some of the pension costs beyond the working careers of active employees and on to future generations.

Single Amortization vs. Separate Amortization Bases. So far the discussion of amortization has focused on amortizing the UAL as a whole over a single amortization period. This approach is straightforward, since there would be no need to track separate amortization bases. However, the UAL is made up of amounts that come from different sources, including: (1) actuarial gains and losses due to differences between actual and assumed plan experience, (2) benefit changes, and (3) changes in actuarial methods and assumptions. As a result, the plan may wish (or in some cases be required) to amortize the UAL from these sources over different periods. For example, changes in the UAL due to benefit changes could be amortized over a shorter period than changes in the UAL due to changes in actuarial assumptions. However, a disadvantage to using multiple amortization periods is that they may increase the volatility of contribution rates.

Funding Target

The funding target is the funded ratio that the plan is trying to reach and maintain through its funding policy. The GFOA's Best Practice "Sustainable Funding Practices for Defined Benefit Pension Plans" recommends a funding target of 100%. Setting the funding target to an anything other than 100% means establishing a policy of making contributions that are greater or less than the amounts theoretically needed to fund the plan. However, funding targets of more than 100% may provide a margin for adverse experience. On the other hand, funding targets of less than 100% may help mitigate pressure for benefit increases.

Risk Management

As noted at the beginning of this report, there are a variety of risks associated with defined benefit plans, including investment risks, demographic risks, benefit design risks, and governance risks. To manage the risks, it is important to first identify the potential impact of a specific risk on plan funding, and then to identify ways to manage the risk. Pension funding policy should include a discussion of the steps needed to monitor and address the risks facing the plan.

Investment risks involve both the risks that investment returns will not meet actuarial expectations and that the volatility of the returns will make contribution rates difficult to budget. Generally, investment risks are managed through changes in asset allocations which, in turn, are based on asset allocation studies and asset/liability analyses. If changes are made to asset allocations, the long-term investment return assumption should also be reviewed and, if necessary, changed to reflect the new asset allocation.

Demographic risks involve the risks that the plan's actual experience related to mortality, retirement patterns, and other demographic factors do not match the actuarial assumptions. It is considered best practice to do experience studies at 5-year intervals to monitor and update the assumptions.

Benefit design risks include the risks that benefit changes will result in future contributions that are unaffordable for the sponsoring government. One way to examine these risks is to have an actuarial valuation of the benefit changes done before the changes are approved by the government, an approach recommended by the GFOA. Benefit design risks can also be examined using stochastic projections that compare future benefits with future contributions and investment returns, as well as scenario (stress) tests which examine changes in funding that result from specific changes in assumptions.

Changes in benefits may require a change in actuarial assumptions. For example, it may be necessary to lower the investment return assumption if benefit increases are based on favorable investment experience (i.e., actual investment returns that are higher than expected returns). As discussed in the section on actuarial assumptions above, the long-term investment return assumption reflects the actuary's estimate of the average return. Using excess earnings rather than additional contributions to provide increased benefits reduces the earnings available to pay current benefits. This, in turn, may require a lower investment return assumption be used, thereby increasing the actuarial accrued liability of the plan. Similarly, when investment gains result in lowered contributions, care should be taken to ensure the contributions do not fall to unreasonable levels.

Governance risks relate to the risks that the plan's administrative policies and procedures are appropriate for carrying out the functions of the plan. Funding policy can address governance risks by discussing the administrative structures that should be in place for monitoring compliance with the funding policy and ensuring that the actuarially determined contributions are made. In addition, funding policy can help ensure that the long-term costs of benefit changes are determined before legislative action is taken.

Conclusion

In funding defined benefit pension plans, governments must satisfy a range of objectives. In addition to the fundamental objective of funding the long-term costs of promised benefits to plan participants, governments also work to: (1) keep employer's contributions relatively stable from year to year; (2) allocate pension costs to taxpayers on an equitable basis; and (3) manage pension risks.

Developing a written funding policy can help decision-makers understand the tradeoffs involved in reaching these goals and document the reasoning that underlies their decisions. By clarifying the funding policy, decision-makers can come to a better understanding of the principles and practices that produce sustainable benefits.

Summary of Funding Policy Elements

Element	Policy Function	Issues to Address
Actuarial Cost Method	Determines accrual patterns of normal costs and actuarial accrued liabilities	• Is the actuarial cost method appropriate for the plan? • Does the cost method produce normal costs that are reasonable stable and consistent with the budgeting process?
Actuarial Assumptions	Determines the assumptions used in the actuarial valuation and other studies	• Does the long-term expected investment return accurately reflect likely investment returns? • How will actual investment returns likely vary from the assumed return over time? • Do the demographic assumptions, including the mortality assumptions, accurately reflect the ongoing experience of the plan? • How often should studies be done to evaluate the actuarial assumptions?
Asset Valuation Method	Determines the actuarial value of assets and, by extension, the unfunded accrued liability	• Should the actuarial value of assets be smoothed? If so, over what period? • Should an asset corridor be applied to prevent the smoothed value of assets from diverging too far from the market value?
Amortization Method	Determines the portion of the unfunded accrued liability that is amortized in the contribution rate each year	• Should the amortization period be open or closed? • Should it be on a level-dollar basis or level-percentage-of-pay basis? • What should be the length of the amortization period? • Should there be separate amortization bases for different components of the unfunded accrued liability?
Funding Target	Determines the funded ratio targeted by the funding policy	• Should the funding target be other than 100%?
Risk Management	Aligns the funding policy with the risk management framework	• How should risks be monitored with regard to investments, demographics, and plan design? • What actions should be taken to address the risks? • How should favorable investment experience be treated? • How should unfavorable investment experience be treated?
Governance	Monitors plan administration and contributions	• What administrative structures should be in place to monitor compliance with the funding policy and ensure actuarially determined contributions are made? • What governance structures should be in place so that the long-term costs of benefit changes are determined before legislative action is taken?

© 2012 - Gabriel Roeder Smith & Company

Appendix A – An Overview of Actuarial Cost Methods

In order to make sound decisions related to pension funding, it is important to understand how the actuarial cost methods work and how the employer's actuarially determined contributions are calculated.

Present Value of Future Benefits

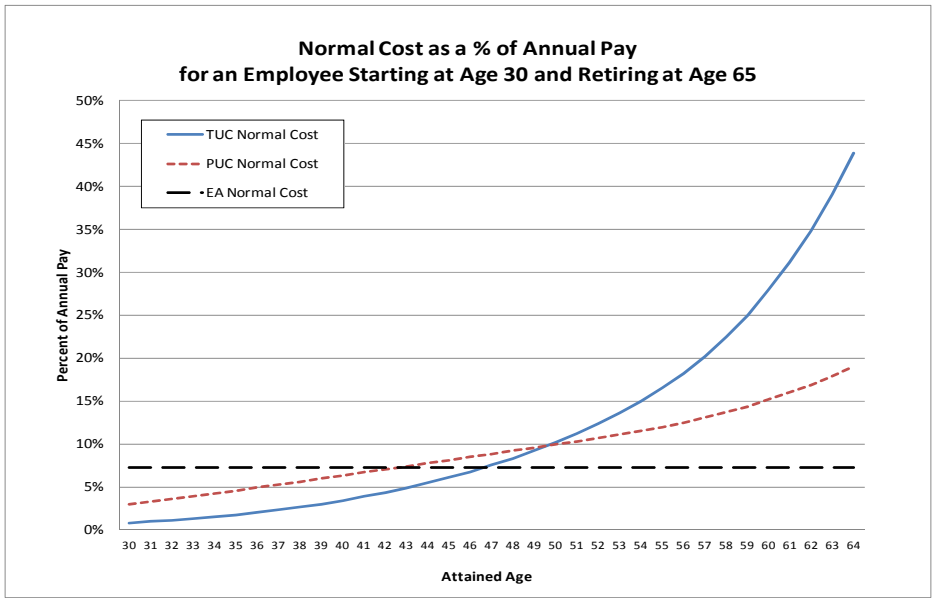
To determine the contributions needed to fund the plan, the value of benefits to be paid in the future must be converted to amounts as of the valuation date. This is done by projecting the future benefits owed to current plan members based on the plan's benefit provisions and actuarial assumptions. These projected future benefits are then discounted using a rate that represents the expected long-term rate of investment return on plan assets. The resulting "projected value of future benefits" (PVFB) is the sum of the discounted values of the projected benefits. Essentially, this is the amount on the valuation date which, if invested at the discount rate, would pay all of the projected future benefits (provided the actuarial assumptions are met).

Normal Cost

An individual's normal cost is the portion of the PVFB that is allocated to a given year of employee service under the actuarial cost method. The plan's total normal cost in a given year is the sum of each individual's normal cost for that year.

There are a variety of actuarial cost methods and different methods take different approaches to allocating the normal cost over an individual's career. Chart 1 illustrates how normal costs vary under three actuarial cost methods: the Traditional Unit Credit (TUC) method, the Projected Unit Credit (PUC) method, and the Entry Age Normal (EAN) cost method. The three lines show the normal cost patterns for an individual employee who begins coverage under the plan at age 30 and retires at age 65, assuming the same benefit and same assumptions. The normal costs are shown as a percent of annual pay.

Chart 1



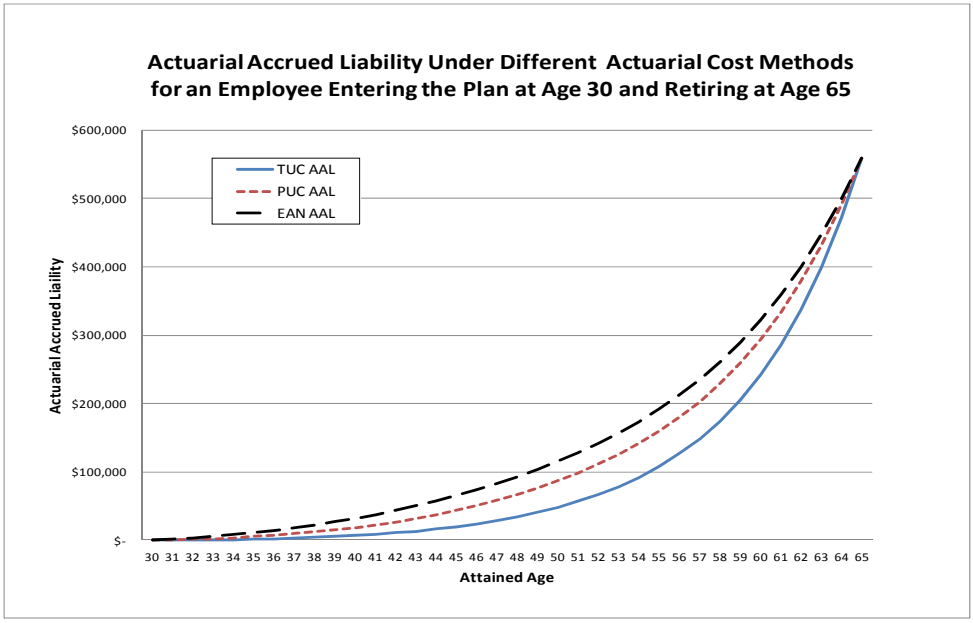
- The TUC method recognizes salary and years of service in the benefit only when earned. As a result, normal costs under this method increase at an accelerating rate as the employee approaches retirement age and as salary increases.

- The PUC method recognizes years of service when earned, but projects salary to retirement age. As a result, normal costs also increase under this method as an employee approaches retirement, but at a slower rate than under the TUC because future increases in salary are recognized in advance.
- The EAN cost method immediately recognizes both projected salary and service. As a result, it allows normal costs to be calculated as a level-dollar amount or as a level-percent-of-pay over the employee's career.

Actuarial Accrued Liability

The actuarial accrued liability (AAL) is the accumulated amount of the normal costs attributed to years of service before the valuation date. Given that the different actuarial cost methods result in different normal costs, it follows that they also result in different accrual patterns for the AAL over a member's employment. Chart 2 shows the accrued AAL for an individual employee who begins coverage under the plan at age 30 and retires at age 65. As with Chart 1, the three lines reflect the different actuarial costs methods applied to the same employee earning the same benefit under the same assumptions.

Chart 2



Since the employee will receive the same benefit at retirement, the actuarial cost methods converge to the same actuarial accrued liability. However, the paths they take are different.

- Under the TUC method, the AAL starts out low and increases over time as each year's accumulating salary and years of service are recognized in the AAL. Much of the AAL under the TUC is accrued in the last 5 years before retirement.
- Under the PUC method, the AAL increases somewhat more rapidly than under the TUC, but the PUC method still shifts recognition of much of the AAL toward the end of the employee's career.
- Under the EAN cost method, a larger portion of the AAL is recognized in earlier years, which in turn, helps provide for more level contribution rates over the employee's career.

Note that Chart 2 shows only the liability accrual pattern for one employee over time. The accrual pattern for the plan as a whole will depend on the age and service characteristics of all employees in the plan.

Appendix B – An Example of Asset Smoothing and Asset Corridors

As discussed in the report, investment gains and losses are often "smoothed" into the actuarial value of assets (AVA) in order to mitigate the impact of investment volatility on contributions. While most public plans use 5-year smoothing periods, plans that smooth over longer periods often use asset corridors to limit the extent to which the value of smoothed assets can diverge from the market value.

For example, under an "80/120" corridor, the smoothed value of assets is not allowed to fall below 80% or rise above 120% of the market value. This helps keep the actuarial value of assets within a reasonable range of the market value. However, during a major market decline or increase, the smoothed value of assets may exceed the corridor. If so, the amount of assets exceeding the corridor must be immediately recognized, adding to the volatility of the UAL and contributions.

Chart 3

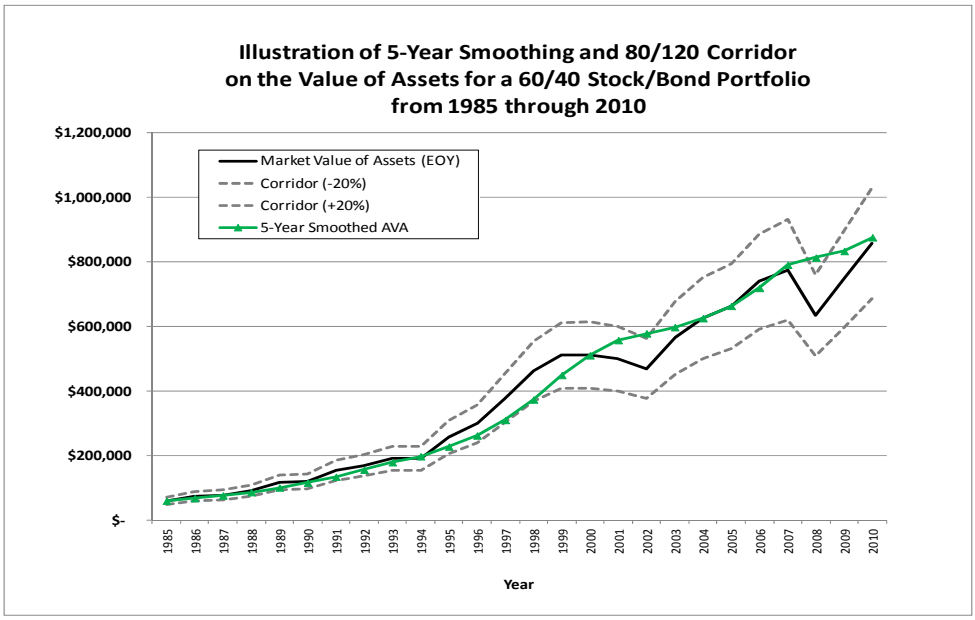


Chart 3 shows the growth of a hypothetical plan's investment portfolio with a 60% mix of large cap stocks and a 40% mix of high-quality corporate bonds over the period from 1985 to 2010. The solid black line shows the market value of assets (MVA) at calendar year-end and the gray dotted lines show the 80/120 corridor boundaries. The green line (marked with triangles) shows the 5-year smoothed AVA.

Several things are interesting about the chart. First, during most of the 1990s, the 5-year smoothed AVA was below the MVA. This is because actual investment returns were substantially higher than expected returns for most of the decade, and the MVA outpaced the AVA. In fact, the 5-year smoothed AVA was very close to the 80% corridor in 1997 and 1998.

When the financial markets declined during 2000-2002, the 5-year smoothed AVA continued increasing, due to continued recognition of gains from the 1990s. When the financial markets picked up again in 2003, the asset losses from 2000-2002 offset part of the asset gains and the 5-year smoothed AVA moved closer to the MVA. However, the financial crisis of 2008 caused the MVA to decline sharply, causing a similar fall in the corridor boundaries. Consequently, in 2008, the 5-year smoothed AVA would have been greater than the upper boundary of the corridor. If the corridor had been in place, the plan would have had to lower its AVA to match the corridor's upper boundary, increasing its UAL and the amount of the UAL amortized in its contribution rate.

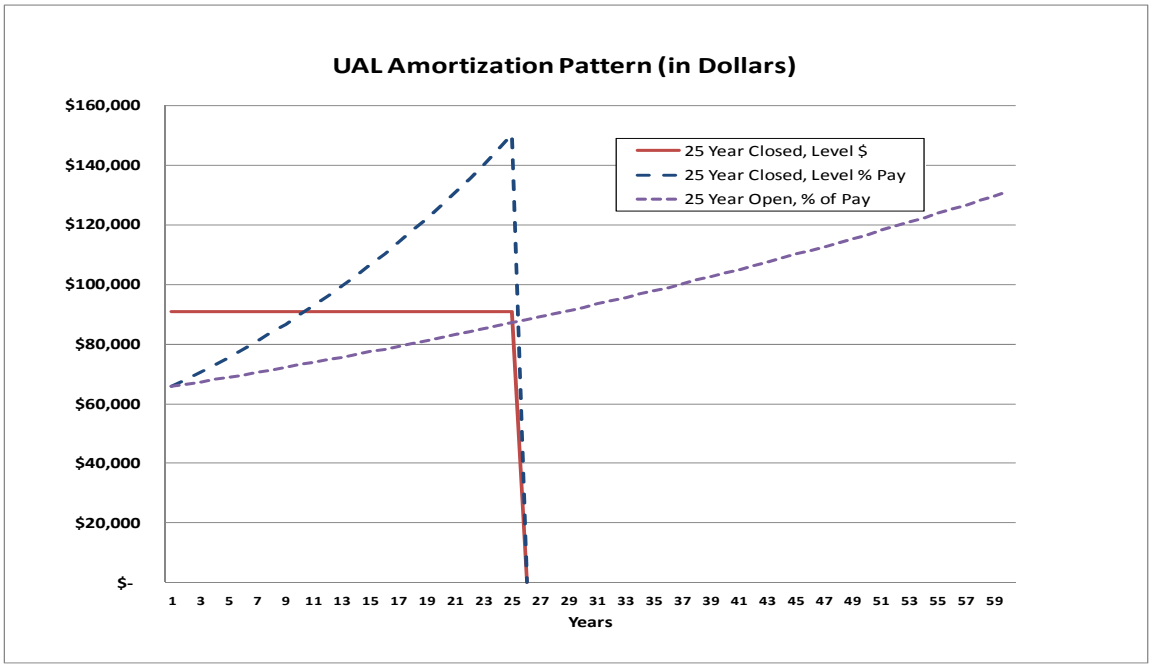
Appendix C: Amortization Patterns under Closed and Open Periods

An important pension funding policy issue is whether the UAL should be amortized over a closed amortization period or an open amortization period. Closed amortization periods pay down the UAL more rapidly and limit negative amortization, but produce more volatility in the contribution rate as the period gets shorter. Open amortization periods help control volatility in the contribution rate, but take longer to pay down the UAL.

Another amortization issue is whether the UAL should be amortized on a level-dollar basis or as a level-percent-of-pay. Level-percent-of-pay amortization initially has lower dollar payments, but these increase each year. Since level-dollar amortization pays a greater portion of the UAL in earlier years, it is more conservative than level-percent-of-pay amortization. However, level-percent-of pay-amortization is more consistent with the budgeting process of most governmental entities.

Chart 4 shows the UAL amortization patterns for: (1) a 25-year closed level-dollar amortization approach; (2) a 25-year closed level-percent-of pay-approach; and (3) a 25-year open percent-of-pay approach. The amortization payments are expressed in dollars.

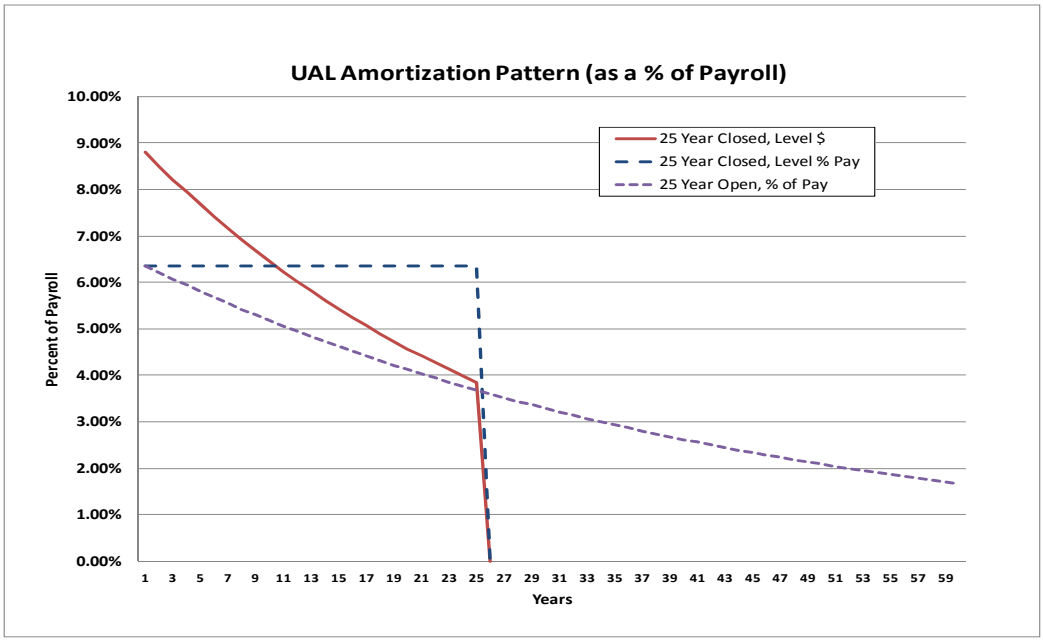
Chart 4



- Under the closed, level-dollar approach, the dollar payments start higher than under the level-percent-of-pay approaches, and remain level until the end of the amortization period, at which time the UAL is completely amortized.
- Under the closed, level-percent-of-pay approach, the dollar payments are initially below the payments made under the level-dollar approach, but exceed the level-dollar payments after approximately 10 years, and ultimately become substantially more than the payments under the level-dollar approach.
- Under the open percent-of-pay approach, the dollar payments start at the same amount as the closed, level-percent-of-pay approach, and remain below the dollar payments under the closed approach. However they continue to increase even after the end of the 25-year period and may continue for several decades.

The dynamics appear different when the same amortization payments are expressed as a percentage of covered payroll, as in Chart 5:

Chart 5



From this perspective, the closed level-dollar payments decline rapidly as a percent of payroll. Under the closed level-percent-of-pay approach the payments remain level until they are fully amortized at the end of the period. However, under the open percent-of-pay approach, the amortization payments extend beyond the 25-year period and continue to decline for decades thereafter. The rate at which they fall depends on a number of factors, including the expected investment return and payroll growth assumption.

Buck Consultants Audit Response

buckconsultants

June 16, 2014

ASRS Board
Arizona State Retirement System
3300 N. Central Avenue
Phoenix, Arizona 85012

Buck's Response to the DRAFT Audit of the 2013 Valuations of the ASRS Plan, System, and LTD Programs by Gabriel Roeder Smith & Company

Dear Members of the Board:

We are pleased with the audit that Gabriel Roeder Smith & Company performed and with its central conclusion: "GRS is pleased to report to the Board, in our professional opinion, the June 30, 2013, actuarial valuations prepared by the retained actuary provide fair and reasonable assessments of the financial position of ASRS."

The audit makes several useful suggestions that we intend to discuss with ASRS. In most cases, the suggestions would make the valuation slightly more conservative than it is now. It may be desirable to schedule the implementation of such suggestions so as to mitigate contribution rate volatility. Accordingly, some of these suggestions may be appropriate for incorporation in the 2014 valuations, while others might be delayed.

Below we discuss specific recommendations of the audit, which are presented in italics:

<u>Actuarial Assumptions</u>

1. *In order to improve the overall completeness of the next actuarial experience study report, we recommend the following:*
   a. The retained actuary should include more detail regarding the "actuals" and "exposures" underlying the assumptions reviewed, and
   b. The retained actuary should provide a thorough analysis of the underlying inflation assumption and separately identify price inflation from wage inflation.

The actual and expected numbers of members who exit by each decrement are available and we will be happy to include them in future experience studies. Because of the size of ASRS, cells are generally large enough to be statistically credible. We should point out that, in our experience study, we did not use ratios based solely on the number of members; rather, we

weighted such ratios by the corresponding liabilities so that the experience of members with large liabilities was weighted more heavily.

Our experience study did not cover the investment return assumption. The Investment Committee of ASRS reviewed this assumption and decided to retain 8% as the annual assumed rate of return. We view this assumption as one set by another party, in the language of the Actuarial Standards of Practice. Because we did not cover the investment return assumption, we also did not analyze price inflation, which is one of the components of investment return. We did break down the wage increase assumption into a productivity component, which varies with the length of a member's service, and a wage inflation component of 3.00%.

2. *We recommend that the retained actuary modify the simplifying assumption used for the actuarial valuations of active members to assume that the post-retirement mortality assumption will be the mortality assumption for annuitants with benefits greater than $14,400.*

This change would make the valuation more conservative in the determination of liabilities of active Plan members. We believe we should study the effect of adopting it and to determine the optimal timing for doing so. The mortality tables we recommended based on our last experience study are significantly more conservative than the tables that the vast majority of other public systems use, especially for retired lives. It may be desirable to make them more conservative for active lives, but because the current tables are already conservative, there is little urgency to do so.

The Society of Actuaries has released its exposure draft of a new 2014 mortality table, but that table excluded all public plan experience. Other actuarial organizations have raised questions about the data selection process followed in constructing this table. Accordingly, it may be prudent to wait for issues relating to the 2014 table to be resolved, or possibly for a new table for public sector plans to be constructed, rather than to further adjust the mortality table that the board has adopted based on the most recent experience study.

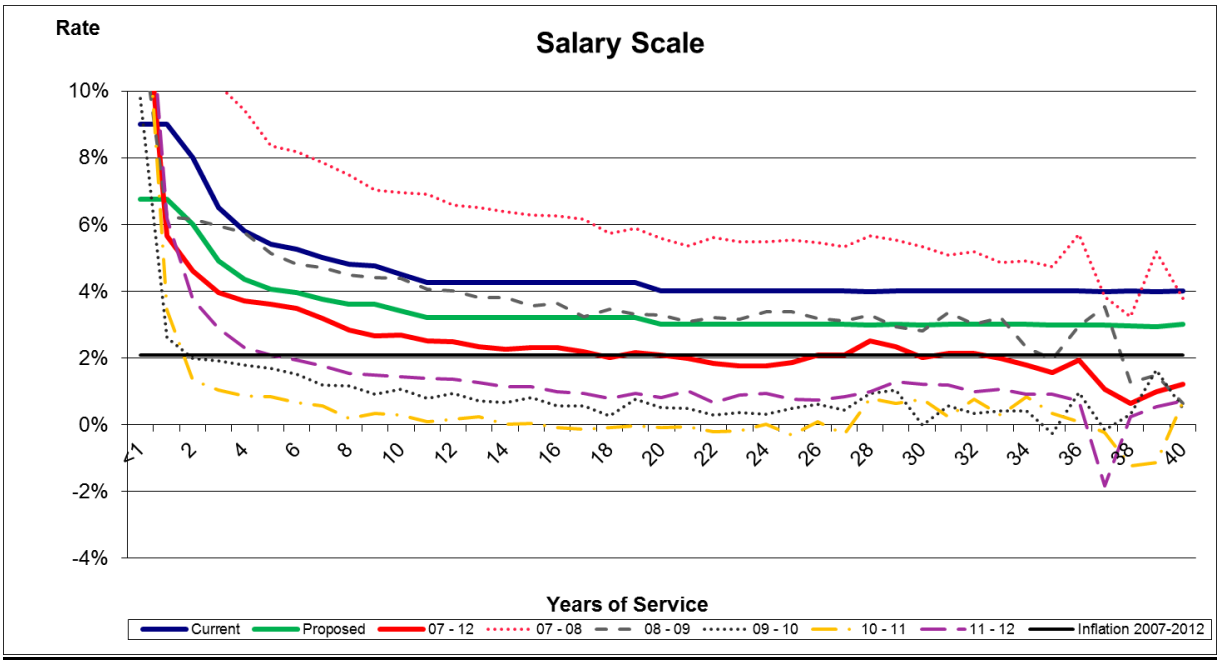
3. *We recommend that in future experience studies the retained actuary considers the impact of retirement incentives on observed retirement rates, both during the year of the retirement incentive as well as the year (or years) following the retirement incentive.*

Actually, we did so in our last experience study. Namely, we excluded from our study (from both the counts of actual and calculation of expected retirements) any member who retired under the terms of an incentive program of any employer during the five-year study period. Our intent was to develop rates of retirement that would apply in the absence of an incentive. When an employer sponsors and incentive program, ASRS charges the employer the excess of the present value of benefits of the accepting members immediately after the incentive (as retired

members) over the present value of benefits of the accepting members immediately before the incentive (as active members). For this purpose, the present value of benefits of the active members should be calculated as though there were no incentive, and that is the way we developed our experience statistics and proposed retirement assumptions.

4. *We recommend that in future experience studies the retained actuary thoroughly considers the economic cycle during the period that the assumptions are being studied and apply the appropriate level of weighting to the experience during the assumption setting process if that economic cycle is not expected to continue.*

We followed this recommendation in our development and discussion of the salary increase assumption. We considered the economic cycle and expectations for the future in determining the appropriate salary increase assumptions to use going forward. In our experience study, we showed the following graph:



This graph shows the average increase by length of service for each of the years from fiscal 2008 through fiscal 2012. The graph clearly shows the effect of the Great Recession on salary increases. In view of the wide range of results over these five years, we recommended rates shown in the green line of the above graph, i.e., rates that are slightly lower than the previous assumption, and lower than the actual results of fiscal 2008, but higher than recent actual rates. This recommendation reflected the belief that the worst effects of the Great Recession on pay increases were in the past, but that future pay increases were likely to be smaller than they were prior to the Great Recession.

Actuarial Methods

5. *We believe that the actuarial methods are reasonable and appropriately applied. As a result, we have no recommendations regarding the application of the actuarial methods.*

Funding Policy and Financial Objectives

6. *We recommend that the ASRS Board consider adopting a formal funding policy which would codify the decisions already made by the Board and the reasons behind the decisions. Additionally, the funding policy can document the steps taken to manage pension risks.*

We find this suggestion worthwhile. Of course, some elements of the funding policy are specified in statute, such as the selection of the projected unit credit funding method. ASRS may want to pursue legislation to move the authority for choosing the funding method to the ASRS, as earlier legislation did with the amortization period. Regardless of whether the authority is changed, it might be useful to document how ASRS prioritizes the objectives of funding adequacy, generational equity, and contribution rate stability, and how its choices of methods help to achieve these objectives.

7. *We recommend that the retained actuary discuss with the Board possible adjustments to the contribution calculation that will eliminate the current disconnects resulting from (1) the different contribution rates during the lag period, and (2) the calculation of the normal cost rate. The current approach to calculating the funding policy contribution will eventually incorporate these costs into the contribution. However, we believe that these adjustments will allocate the contributions to the most appropriate period of time and keep the contribution rates more stable.*

These are two conservative suggestions – they would increase contribution rates when implemented and then help to prevent increases in subsequent years. We have discussed addressing the lag period before, but contribution rates at that time were increasing so rapidly that it was considered impractical to do so. We believe it would now be appropriate to study the financial effects of these changes and adopt them, perhaps on a staggered schedule, to mitigate contribution rate volatility.

Actuarial Valuation Results

8. *In the next actuarial valuation, we recommend that the retained actuary incorporate actual pay history into their valuation of active participants and update the actuarial valuation of the Other-than-Plan retirees.*

We agree.

Content of Valuation Report

9. *In order to improve the ability of the report to communicate the assumptions, methods, and plan provisions incorporated into the actuarial valuations of the ASRS retirement programs, we recommend that the retained actuary incorporate the noted enhancements to future valuation reports.*

We agree with the suggestions regarding the content of the valuation report and will reflect them in our 2014 valuation reports.

Thank you for this opportunity to respond to the audit.

I am a Fellow of the Society of Actuaries, a member of the American Academy of Actuaries, and an Enrolled Actuary. I meet the Academy's Qualification Standards to issue this statement of Actuarial Opinion.

Sincerely,

Charles E. Chittenden
Principal & Consulting Actuary

ARIZONA STATE RETIREMENT SYSTEM

3300 NORTH CENTRAL AVENUE • PO BOX 33910 • PHOENIX, AZ 85067-3910 • PHONE (602) 240-2000
7660 EAST BROADWAY BOULEVARD • SUITE 108 • TUCSON, AZ 85710-3776 • PHONE (520) 239-3100
TOLL FREE OUTSIDE METRO PHOENIX AND TUCSON 1 (800) 621-3778
EMAIL ADDRESS: ASKMAC@AZASRS.GOV • WEB ADDRESS: WWW. AZASRS.GOV

Paul Matson
Director

MEMORANDUM

TO: Mr. Tom Manos, Chair, Arizona State Retirement System (ASRS) Board

FROM: Mr. Gary Dokes, Chief Investment Officer (CIO)
Mr. Dave Underwood, Assistant Chief Investment Officer (ACIO)

DATE: June 16, 2014

RE: **Agenda Item #7:** Presentation, Discussion, and Appropriate Action Regarding ASRS Investment Program Updates

Purpose
To present and discuss information regarding ASRS investment program updates.

Recommendation
Informational only; no action required.

Background
The CIO, and ACIO will present and facilitate a discussion of the ASRS Investment Program.

The topics listed below are intended to comprehensively cover how ASRS investments are managed, what and why recent strategic/tactical investment decisions have been made and share other information regarding the investment activities of the ASRS.

a. ASRS Fund Positioning
b. IMD Investment House Views – June 2014
c. Asset Class Committee (ACC) Activities
d. Tactical Portfolio Positioning
e. Strategic Asset Allocation Policy (SAAP) Implementation
f. IMD Projects, Research and Initiatives

Attachment: Investment Program Updates Report

Arizona State Retirement System

Board of Trustees

Investment Program Updates

June 27, 2014

Presented by:
Gary R. Dokes, Chief Investment Officer, ASRS
David Underwood, Assistant Chief Investment Officer, ASRS
Karl Polen, Head of Private Markets Investing, ASRS
Al Alaimo, Fixed Income Portfolio Manager, ASRS
Eric Glass, Portfolio Manager of Private Markets, ASRS

CONTENTS

Total Fund Positioning – 05/31/14 3

Arizona State Retirement System's Investment Management House Views 6

June 2014 .....

U.S. Equities 6

Non – U.S. Equities 7

Fixed Income 8

Real Estate 10

Private Equity 11

Commodities 12

Opportunistic Investments 13

Glossary 13

Asset Class Committee (ACC) MEETINGS 14

Private Markets Committee (PRIVMC) 15

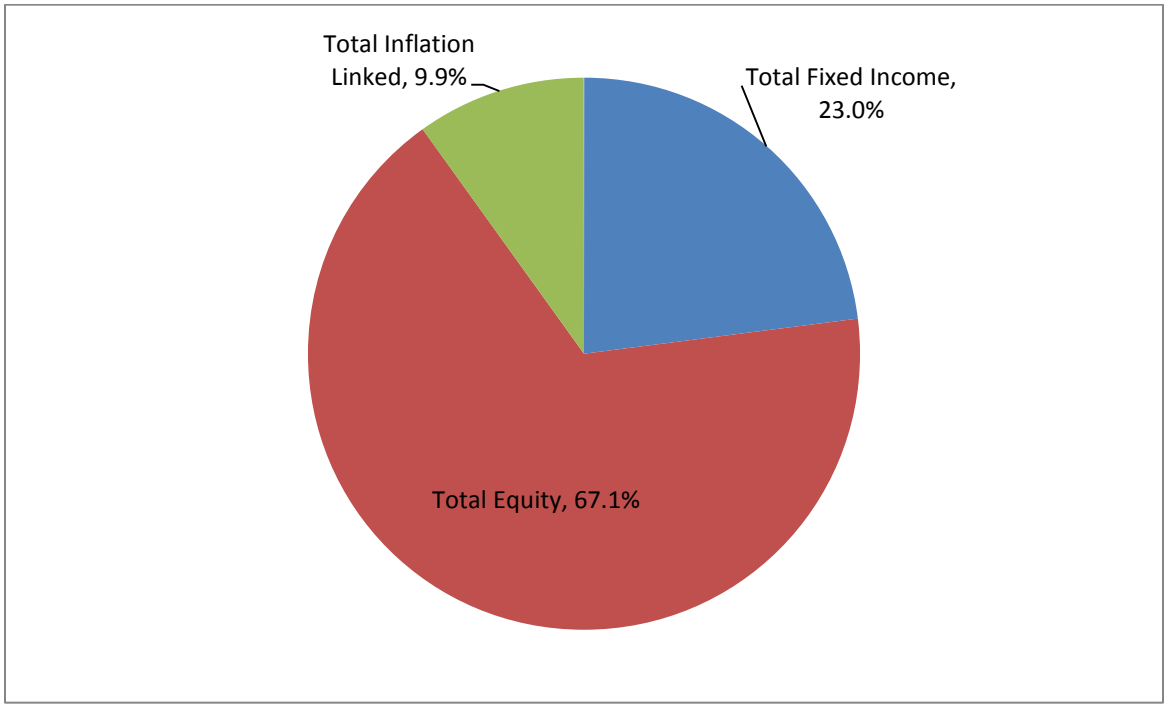
Public Markets Committee (PUBMC) 16

Tactical Portfolio Positioning 17

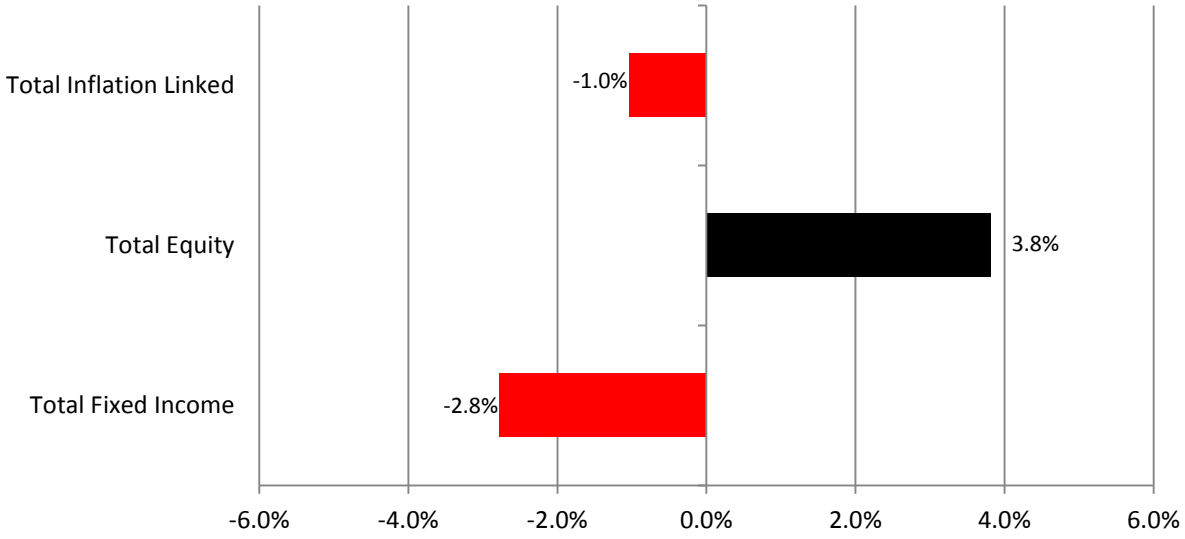
IMD (Investment Management Division) Activities, Projects and Research Initiatives 17

TOTAL FUND POSITIONING – 5/31/14

ACTUAL PORTFOLIO



ACTUAL PORTFOLIO (ASSUMED GTAA ALLOCATION VS. ADJUSTED SAA POLICY *)



**Real Estate and Private Equity actual weight is equal to policy weight during the implementation of the asset class.*

**Over/Underweights include both GTAA positions as well as IMD tactical considerations.*

Note: Opportunistic & Private Debt, Opportunistic Private Equity, Farmland & Timber, Real Estate and Private Equity market values are reported on a quarter-lag and adjusted to include the current quarter's cash flows. Within the Assumed GTAA Allocation vs. Adjusted SAA Policy chart, Real Estate was prorated to domestic equity, international equity and fixed income. Private Equity was prorated to domestic equity.

Pension (Plan, System, HBS Assets) — ASRS Market Value Report — As of: Friday, May 30, 2014

Account Manager	Account Manager Style	Fixed Income		Equity		Inflation Linked		Total	Pct of Fund
		Active	Enh/Passive	Active	Enh/Passive	Active	Enh/Passive		
State Street B&T: Boston	Master Cash & Pension Acct.		162,815,927					162,815,927	0.48%
	Cash Total							**$162,815,927**	0.48%
GTAA Managers (2)	Active GTAA	1,108,500,300						1,108,500,300	3.27%
Blackrock: San Francisco	Passive (Intermediate Gov Credit)		23,896,767					23,896,767	0.07%
ASRS: Phoenix	Enhanced Passive F2		1,977,765,294					1,977,765,294	5.83%
Blackrock: San Francisco	Passive (US Debt Index)		711,390,076					711,390,076	2.10%
	Core Fixed Income Total							**$3,821,754,993**	11.27%
								Core Fixed Income Policy	**13.00%**
Columbia: Minneapolis	Active	743,420,187						743,420,187	2.19%
Shenkman: Connecticut	Active	74,409,938						74,409,938	0.22%
JP Morgan: Indianapolis	Active	328,122,039						328,122,039	0.97%
	High Yield Fixed Income Total							**$1,145,952,165**	3.38%
								High Yield Fixed Income Policy	**5.00%**
	US Fixed Income Total							**$4,967,707,158**	14.64%
								US Fixed Income Policy Range: 8% - 28%	**18.00%**
PIMCO (local): Newport Beach	Active	348,494,510						348,494,510	1.03%
Ashmore (blended): London	Active	562,226,722						562,226,722	1.66%
	EM Debt Total							**$910,721,232**	2.68%
								EM Debt Policy	**4.00%**
	Opportunistic Debt							**$849,822,562**	2.50%
								Opportunistic Debt Policy Range: 0% - 10%	**0.00%**
	Private Debt Total							**$902,116,163**	2.66%
								Private Debt Policy	**3.00%**
	Fixed Income Total							**$7,793,183,042**	22.97%
								Total Fixed Income Policy Range: 15% - 35%	**25.00%**
Intech: FL	Active (Growth)			524,568,291				524,568,291	1.55%
LSV: Chicago	Active (Value)			786,316,797				786,316,797	2.32%
GTAA Managers (2)	Active GTAA			1,114,746,317				1,114,746,317	3.29%
ASRS: Phoenix	Passive E2				4,912,588,329			4,912,588,329	14.48%
ASRS: Phoenix	Enhanced Passive E7				791,134,515			791,134,515	2.33%
ASRS: Phoenix	Enhanced Passive E8				509,472,720			509,472,720	1.50%
ASRS: Phoenix	Risk Factor Portfolio				500,629,963			500,629,963	1.48%
	Large Cap Equity Total							**$9,139,470,159**	26.94%
								Large Cap Policy	**23.00%**
Wellington: Boston	Active (Core)			418,089,739				418,089,739	1.23%
CRM: New York	Active (Value)			99,100,622				99,100,622	0.29%
ASRS: Phoenix	Passive E3 (Growth)				509,238,459			509,238,459	1.50%
ASRS: Phoenix	Passive E4 (Value)				526,180,615			526,180,615	1.55%
	Mid Cap Equity Total							**$1,552,609,435**	4.58%
								Mid Cap Policy	**5.00%**
TimesSquare: New York	Active SMID (Growth)			461,772,531				461,772,531	1.36%
DFA: Santa Monica	Active (Value)			409,312,119				409,312,119	1.21%
Champlain:Vermont	Active (Core)			97,507,711				97,507,711	0.29%
ASRS: Phoenix	Passive E6				483,750,075			483,750,075	1.43%
	Small Cap Equity Total							**$1,452,342,436**	4.28%
								Small Cap Policy	**5.00%**
	U.S. Equity Total							**$12,144,422,031**	35.80%
								US Equity Policy Range: 26% - 38%	**33.00%**
Brandes: San Diego	Active (Value)			549,067,070				549,067,070	1.62%
Aberdeen: Edinburgh	Active (Value)			518,997,351				518,997,351	1.53%
Hansberger: Ft. Lauderdale	Active (Growth)			345,286,274				345,286,274	1.02%
Walter Scott: Edinburgh	Active (Growth)			238,486,640				238,486,640	0.70%
GTAA Managers (2)	Active GTAA			1,063,819,276				1,063,819,276	3.14%
Blackrock: San Francisco	Passive (EAFE)				2,417,751,406			2,417,751,406	7.13%
	Large Cap Developed Non-US Equity Total							**$5,133,418,253**	15.13%
								Large Cap Developed Policy	**14.00%**
AQR: Greenwich	Active (EAFE SC)			178,232,590				178,232,590	0.53%
DFA: Santa Monica	Active (EAFE SC)			226,371,709				226,371,709	0.67%
Franklin Templeton: San Mateo	Active (EAFE SC)			415,906,369				415,906,369	1.23%
Blackrock: San Francisco	Passive (EAFE SC)				469,212,977			469,212,977	1.38%
	Small Cap Developed Non-US Equity Total							**$1,289,727,976**	3.80%
								Small Cap Developed Policy	**3.00%**
William Blair: Chicago	Active (EM)			461,762,584				461,762,584	1.36%
Eaton Vance: Boston	Active (EM)			513,528,765				513,528,765	1.51%
LSV: Chicago	Active (EM)			308,747,094				308,747,094	0.91%
Blackrock: San Francisco	Passive (EM)				687,901,238			687,901,238	2.03%
	Emerging Markets Equity Total							**$1,971,939,681**	5.81%
								Emerging Markets Policy	**6.00%**
	Non-US Equity Total							**$8,395,085,910**	24.75%
								Non-US Equity Policy Range: 16% - 28%	**23.00%**
	Private Equity Total							**$2,018,830,127**	5.95%
								Private Equity Policy Range: 5% - 9%	**7.00%**
	Opportunistic Equity							**$204,841,646**	0.60%
								Opportunistic Equity Policy Range: 0% - 3%	**0.00%**
	Equity Total							**$22,763,179,713**	67.10%
								Total Equity Policy Range: 53% - 73%	**63.00%**
Gresham: New York						849,432,638		849,432,638	2.50%
GTAA Managers (2)	Active GTAA					345,588,902		345,588,902	1.02%
	Commodities Total							**$1,195,021,540**	3.52%
								Commodities Policy Range: 1% - 7%	**4.00%**
GTAA Manager (1)	Active GTAA					54,828,894		54,828,894	0.16%
	Real Estate Total							**$2,074,445,895**	6.11%
								Real Estate Policy Range: 6% - 10%	**8.00%**
	Infrastructure Total							**$0**	0.00%
								Infrastructure Policy Range: 0% - 3%	**0.00%**
	Farmland & Timber Total					99,329,710		**$99,329,710**	0.29%
								Farmland & Timber Policy Range: 0% - 3%	**0.00%**
	Opportunistic Inflation Linked Total							**$0**	0.00%
								Opportunistic I/L Policy Range: 0% - 3%	**0.00%**
	Inflation Linked Total							**$3,368,797,146**	9.93%
								Inflation Linked Policy Range: 7%-15%	**12.00%**
	TOTAL Amounts	$4,067,492,416	$3,725,690,626	$10,955,306,190	$11,807,873,524	$3,468,126,856	$0	**$33,925,159,901**	**Total Fund**
	TOTAL Percent	11.99%	10.98%	32.29%	34.81%	10.22%	0.00%		

Asset Class	Actual Portfolio	SAA Policy: Target (Range)	Rebalancing Assumed Port	Rebalancing Adj Policy	Assumed - Adjusted % diff	Assumed - Adjusted $ diff	Policy Band check Actual - Adj	Passive Min	Passive Actual
Cash	0.48%								
Core	11.27%	13%						50%	72%
High Yield	3.38%	5%							
US Fixed Income	14.64%	18% (8-28%)	14.90%	18.53% (9-29%)	-3.63%	-$1,231,089,296	OK		
EM Debt	2.68%	4%		4.00%					
Opportunistic Debt	2.50%	0% (0-10%)	2.50%	0% (0-10%)	2.50%	$849,822,562	OK		
Private Debt	2.66%	3%		3.00%					
Total Fixed Income	**22.97%**	**25% (15-35%)**	**22.75%**	**25.53% (16-36%)**	**-2.78%**	**-$943,190,532**	**OK**		
Large Cap	26.94%	23%							
Mid Cap	4.58%	5%							
Small Cap	4.28%	5%							
US Equity	**35.80%**	**33% (26-38%)**	**37.19%**	**34.86% (28-40%)**	**2.33%**	**$789,046,100**	**OK**	**50%**	**65%**
Developed Large Cap	15.13%	14%							
Developed Small Cap	3.80%	3%							
Emerging Markets	5.81%	6%							
Non-US Equity	**24.75%**	**23% (16-28%)**	**24.33%**	**23.47% (16-28%)**	**0.86%**	**$290,459,055**	**OK**	**30%**	**43%**
Private Equity	5.95%	7% (5-9%)	5.95%	5.95% (4-8%)	0.00%	$0	OK		
Opportunistic Equity	0.60%	0% (0-3%)	0.60%	0% (0-3%)	0.60%	$204,841,646	OK		
Total Equity	**67.10%**	**63% (53-70%)**	**68.07%**	**64.28% (54-71%)**	**3.79%**	**$1,284,346,801**	**OK**		
Commodities	3.52%	4% (1-7%)	2.94%	4.08% (1-7%)	-1.14%	-$385,657,086	OK		
Real Estate	6.11%	8% (6-10%)	5.95%	6.11% (4-8%)	-0.16%	-$54,828,894	OK		
Infrastructure	0.00%	0% (0-3%)	0.00%	0% (0-3%)	0.00%	$0	OK		
Farmland & Timber	0.29%	0% (0-3%)	0.29%	0% (0-3%)	0.29%	$99,329,710	OK		
Opportunistic I/L	0.00%	0% (0-3%)	0.00%	0% (0-3%)	0.00%	$0	OK		
Total Inflation Linked	**9.93%**	**12% (8-16%)**	**9.18%**	**10.19% (6-14%)**	**-1.01%**	**-$341,156,270**	**OK**		
Total	**100.00%**	**100%**	**100.00%**	**100.00%**	**0.00%**	**$0**		**30%**	**42%**
								Internally Managed Portfolios:	
Total GTAA								**$9,710,130,008**	**29%**
Bridgewater	$3,086,948,160	9.1%					**Opportunistic definitions:**		
Windham	$600,535,529	1.8%					1) Tactical in nature: Function of market dislocation AND		
Total	**$3,687,483,689**	**10.9%**					2a) Outside SAA benchmark, OR		
Policy	**10% ±5%**	**OK**					2b) Within SAA benchmark but absolute return oriented		

ARIZONA STATE RETIREMENT SYSTEM'S INVESTMENT MANAGEMENT HOUSE VIEWS

(Notable changes from the previous month are highlighted in RED)

JUNE 2014

U.S. EQUITIES

Primary Market Metrics & Indicators:

1. Fundamentals: **POSITIVE**
   - Major risks have receded and economic data suggests stable, sub-trend growth into 2014.
   - Persistently high U.S. unemployment raise questions about a sustainable recovery, but no other tailspin issues have surfaced.
   - At risk longer term due to stimulus measures; inflation remains generally subdued.
   - There is considerable liquidity; Federal Reserve policy remains accommodative.
   - Overall U.S. corporate profits are still growing, but with decelerating momentum as revenue trends are flat and pressures on profit margin expansion are surfacing.

2. Valuations: **NEUTRAL**
   - P/E ratios (forward) have inched lower recently, and though less generous, and marginally less so for the mid- and smaller-sized companies, they remain near historic averages: S&P 500, 14.7x-16.3x, S&P MID, 16.5x-19.3x; S&P SC600, 16.6x-20.3x.
   - Historic P/Es imply advances of 5-10% for mid and small caps; 9-12% for S&P 500.
   - Still rising earnings and low yields on 10-Yr Treasury notes combine for equity risk premiums that are favorably above the 4.0% long-range average for large caps, but market advances have trimmed those of mid- and small-caps to near 3.0%.

3. Sentiment: **POSITIVE**
   - Lessened near-term equity market volatility (i.e., VIX Index) still reflects growing acceptance of risk-oriented assets.
   - Asset flows that had gone to bonds and non-U.S. equities until 2013 continue to shift toward equities, though not necessarily to stock mutual funds

Commentary:

Throughout 1Q2014, IMD systematically pared back the allocation of U.S. stocks to address capital calls in the Plan's private equity and real estate asset classes. Proportionally more was withdrawn from the small cap and mid cap sub-classes. Strong price advances in 2013 outpaced earnings growth in these categories to the extent that their short-run risk premiums are less compelling than the larger-cap counterparts. This has also been reflected in the waning performance of small cap stocks *relative* to their large and mid- cap counterparts over 1Q2014. Small caps are off by about 1.5%; large caps and midcaps are up 4.6% and 3.8%, respectively.

Notwithstanding some opinions that prices of U.S. stocks are greatly overextended and thus due for a precipitous decline, data suggests otherwise. Valuations of domestic equities are full, but generally don't yet exceed long-term average valuations by much. Business conditions are constructive if not vibrant. Moreover, the equity markets have been resilient in spite of unsettling political events and have rebounded on shallow dips over 1H2014. Rather than setting up for an abrupt decline, in re-rating over the past year, the markets have pulled forward some return from future periods. This implies that future equity returns will still be

available however not to the magnitude as those experienced over the past year. This drives our "*NEUTRAL*" opinion on Valuations and "*POSITIVE*" opinions on Fundamentals and Sentiment.

CURRENT PORTFOLIO POSTURE: Over-Weight vs. SAA target

NON – U.S. EQUITIES

Primary Market Metrics & Indicators:

1. Fundamentals: **POSITIVE**
   - GDP growth in the Eurozone has begun to look less recessional while that of the lesser-developed economies remains off its pace, but comparatively stronger.
   - Relatively inexpensive and available money supports a shift toward risk assets.
   - Monetary and economic policies are focused on controlling economic growth and fiscal stability.

2. Valuations: **POSITIVE**
   - Reasonable global valuations relative to U.S.; price-to-book values of 1.5x - 1.9x; P/Es of 13.5x – 15.2x on trend earnings.
   - Dividend yields are incrementally more favorable with most ranging from 1.5x to 1.6x that of the S&P500.

3. Sentiment: **POSITIVE**
   - Money flows continue toward both U.S. and non-U.S. equities; excepting the emerging economies markets, investors are less guarded and remain constructive on global risks.
   - Major non-U.S. markets performances are keeping pace with those of the U.S.

Commentary:

Global equities have begun responding positively to stabilizing economic momentum across major economies. Weaker than expected economic readings earlier in the year from China and the U.S. triggered corrections in the equities markets and a 50 basis points decline in U.S. 10-year bond yields. It is also attributable to a 5% relative underperformance of global cyclical equities versus more defensive stocks. U.S. ISM indices and their international PMI counterparts are rising; this often leads to better performance of equities and to an extent, markets have reacted. Other business conditions appear to be toughing tipping macro surprise indicators to positive. Adding to confidence is that PMI new orders globally are mid-range, so any slide back would be small and thus not transfer into major negative signal to the equities markets. Various measures of global monetary conditions such as policy rates, money supply growth and currency valuation continue to ease and the tapering policy of the U.S. Federal Reserve is not yet bringing about a broad tightening of monetary conditions.

Available liquidity is supportive for re-rating equity risk premiums. Equity risk premiums on international stocks of over 5% exceed those of the U.S. by about 100 basis points. Both imply ample compensation for investment, more so for the former. Falling yields among high-yield bonds and other compressions of credit spreads are further magnifying the relative advantage available in current equity risk premiums.

The Japanese equities markets continue to be challenged after responding well earlier in 2013. Japanese economic reform continues, but the markets are waiting for follow-on to the Abe policies. They might be unduly bearish. The solid gains in personal consumption from the spurt of income growth are now appearing vulnerable to this new round of taxes. Most remain of the opinion that the Bank of Japan will need to ease additionally if hoped-for 2% annualized inflation targets are to be met. The bulk of the rise in inflation so far this year has come via higher import prices, which now are set to fall back. This suggests the BoJ will need to expand its program of bond purchases in 2H2014, and possibly further broadening of quantitative easing.

Emerging markets (EM) overall, are enigmatic, but of late are trading more favorably. Having undergone two years of price correction, valuations for the most part remain attractive as compared to those of the developed economies. But an inherent "value trap" persists, as economic fundamentals continue to shift about for the larger countries, weaken for those with large external debt balances yet are surprisingly solid for many others. Up until recently, capital was withdrawn indiscriminately from EM equity markets, despite select opportunities at the specific company level. Staff is watching this equilibration with interest of for opportunities to shift the allocation of the sub-class to above policy weight.

IMD moved equities positioning in late 4Q2013 to a more neutral allocation to both the U.S. markets asset class, and to the Non-U.S. developed-economies equities class, and expects to increase the Non-U.S. exposure opportunistically over the course of 2014.

CURRENT PORTFOLIO POSTURE: Approx. Equal Weight vs. SAA target

FIXED INCOME

Primary Markets Metrics & Indicators:

1. Fundamentals: **NEUTRAL**
   - Over the past few years, fundamentals in the fixed income markets have been dominated by an extremely accommodative monetary policy by the Federal Reserve. This has included massive, unprecedented bond buying programs of both treasury bonds and agency MBS securities known as "quantitative easing" that began in 2009 during the credit crisis and continues to this day. The Fed has now gradually begun to reduce its monthly purchases with a potential complete cessation of bond buying by the end of this year. In addition, the Fed has pledged to keep short-term rates near zero over an extended time depending on select economic targets and conditions. While these policies have kept interest rates artificially low, the potential cessation of bond buying activities along with an improving U.S. economic outlook could lead to higher interest rates over an intermediate to long-term time frame.
   - In the near-term, long-term interest rates have fallen in 2014 in response to a combination of factors including some disappointing economic data, concerns about global growth, some geopolitical uncertainty (ex. Ukraine), subdued inflation expectations and possible short covering by investors positioned for rising rates.

2. Valuations: **NEGATIVE**
   - The core fixed income market is relatively unattractive due to low overall yields as Treasury rates remain at low levels, investment-grade credit spreads are relatively tight and spreads on agency MBS are somewhat compressed due to aggressive buying by the Fed. Ultimately, we believe the

Fed will end its aggressive bond buying, and Treasury rates will rise over the intermediate-term from artificially low levels in the current market. That being said, core fixed income remains a safe haven in times of market turbulence and tends to perform well when risky assets such as equities sell off.

- With a benign outlook for corporate defaults and an overall demand in the market for yield, the valuation of high yield bonds has substantially compressed since mid-2012. As a result, the market has lost much of its return potential relative to prior years and will likely achieve low to mid-single-digit returns over the coming year.
- While emerging market debt denominated in local currencies offers attractive yields, it comes with the added risk that emerging market currencies depreciate in value relative to the U.S. dollar resulting in poor returns as happened in 2013. Of most concern is the potential for a sustained period of US dollar appreciation as has occurred periodically in the past (such as the 1990's) that could adversely affect the returns of EM local currency debt going forward.
- Private debt offers the most attractive opportunity in the fixed income markets with double-digit yields readily available for investors willing to accept illiquidity.
- Select areas of opportunistic debt such as distressed debt (both corporate and structured credit) and excess mortgage-servicing rights ("MSRs") also offer opportunities to potentially achieve double-digit returns.

3. Sentiment: **NEUTRAL**

- Following a multi-decade period of declining interest rates, IMD has modest concerns that investors sentiment is shifting away from fixed income. That being said, going forward, IMD believes demand will continue for income producing assets particularly those which offer a yield premium.

Commentary:

IMD remains underweight in its overall fixed income target due to the relatively low yields offered in the public fixed income markets as well as the risk of potentially higher treasury rates. ASRS is currently underweight in its SAAP target for core fixed income, high yield and emerging market debt. While core fixed income offers important defensive characteristics to potentially balance out the overall risks of the total fund portfolio, low levels of U.S. Treasuries and generally tight spreads in the investment-grade bond markets make it generally unattractive.

Furthermore, IMD remains concerned about the potential for higher Treasury rates and the impact on returns for core fixed income, should the Fed completely end its quantitative easing programs. In high yield, which historically is less sensitive to higher interest rates, spreads have compressed to levels which make potential returns much less compelling than in prior years. In emerging market debt, we are concerned about the currency risk embedded in the local currency bond markets of this asset class.

IMD sees the most attractive opportunities in fixed income in select credit markets -- particularly private debt and opportunistic debt -- where compelling yield and total return opportunities exist. Opportunistic debt includes a number of mandates such as distressed debt and structured asset-backed securities that are likely to provide very attractive returns. Since December, we have established two new multi-strategy mandates with strategic partners in opportunistic debt to take advantage of potential investment opportunities as European banks disgorge troubled fixed income assets.

CURRENT PORTFOLIO POSTURE: UNDERWEIGHT vs. SAA target

REAL ESTATE

Primary Market Metrics & Indicators:

1. Fundamentals: **POSITIVE**
   - While vacancy is declining across the board, excess inventory remains a problem in some sectors especially retail and suburban office.
   - Our review of property market fundamentals leads to emphasize apartments, industrial properties, medical office buildings, senior housing self-storage, and student housing in our current investing efforts for demographic and macro policy reasons.
   - There are relatively few foreclosures on high quality property, but there continues to be pressures on refinancing of legacy leverage structures and we participate in those transactions through several of our manager relationships.
   - Single family housing has turned the corner with effects rippling through the economy. Recovery in construction and NOI has been led by apartments to date.
2. Valuations: **NEUTRAL**
   - On a total market basis, valuations have recovered from recession lows but are still about 15% below prior peak. However, coastal markets have rebounded more strongly than interior markets.
   - High quality coastal market properties are trading at historic low cap rates; however these cap rates still reflect approximately a normal spread to treasury. The financing market for assets of this quality has recovered and supports these valuations by providing fixed rate financing that mitigates the risk of later cap rate expansion. International investors looking for safe assets have contributed to demand in the coastal markets.
   - Recent increases in treasury rates do not appear to have affected commercial real estate valuations. Many observers believe that ~100bps of rate increase was already discounted into cap rates.
   - REITs are trading at a 6% premium to NAV with an average dividend yield of 3.8%. This reflects a 120bps spread to the 10 year treasury, which is a bit higher than the historical average of 108bps.
3. Sentiment: **POSITIVE**
   - U.S. focused real estate fund raising rose 13% to $76 billion per year. U.S. focused dry powder has trended down to approximately $80 billion.
   - Global commercial real estate transaction volume peaked at around $700 billion in 2007, but dropped to about a third of that during the global financial crisis. Current volume of approximately $550 billion is double the recession trough, but still well below the peak.
   - Debt availability has improved considerably since the depth of the recession, but is still tight by historic standards for all but the most desirable properties. Construction financing remains a considerable challenge, even for well justified projects.

Commentary:

IMD continues to implement its separate account real estate strategic manager program. ASRS adopted an updated pacing and implementation plan in December, calling for $500 million in new commitments in 2014 including $350M allocated to niche and tactical opportunities.

CURRENT PORTFOLIO POSTURE: UNDERWEIGHT * vs. SAA target *in program funding/build-out phase

PRIVATE EQUITY

Primary Market Metrics & Indicators:

1. Fundamentals: **POSITIVE**
   - The U.S. economy continues to show steady improvement.
     - ◊ The energy sector is dynamic with massive new investment in "tight oil" and related infrastructure and services, with supply improvements also resulting in improved energy efficiency particularly of benefit to manufacturers.
     - ◊ Healthcare is being reshaped to implement the requirements of "Obamacare"
     - ◊ The U.S. continues to be a global leader in technology innovation.
   - Europe continues to struggle in recovering from the financial crisis although recent data suggests a pickup in economic activity. Its problems are exacerbated by a unified currency without unified fiscal policy and it is expected to experience a very slow recovery.
   - Emerging markets have slowed while the largest emerging markets are transitioning to focus on domestic consumption.

2. Valuations: **NEUTRAL**
   - Purchase price multiples in 2013 (through Q3) were 8.4x, roughly flat from 2012 levels and below 2007 peak valuations. Over the course of 2013, large deal multiples rose from 10x to 11x while small deals fell from 4.0x to 2.5x.
   - The leveraged loan and high yield debt markets were active in 2013 reaching multi-year highs for net issuance, albeit principally for refinancing. Single B high yield spreads have recently dipped below 350bps.
   - Total leverage in 2013 (through Q3) ticked up to 5.3x from 5.1x in 2012, although still down ~0.8x turn from the 2007 peak.

3. Sentiment: **NEUTRAL**
   - Globally, fund raising was up from $381B (1,035 funds) closed 2012 to $454B (873 funds) closed in 2013. In aggregate, there are 2,000+ funds currently seeking ~$800B. In North America fund raising was up from $201B (475 funds) closed 2012 to $288B (487 funds) closed in 2013.
   - Dry powder of nearly $1.0 trillion globally in all categories rose from $941 at the end of 2012.
   - In 2013, PE deal flow fell 10% globally while the aggregate value of deals was up 10% in N. America, down 6% in Europe, and down 28% in Asia.
   - In 2013 there were 1,300+ exits valued at $300B, the highest count on record and matching the value of 2011. The average exit size of $500M was the same as 2012.
   - The IPO market continued to trend up in 2013 (particularly in H1) as equity markets rallied.

Commentary:

Areas of emphasis are U.S middle market buyout with focus on managers with strong operational capability. Vertical strategies in energy, healthcare and technology are under consideration. IMD will reduce emphasis on large buyout strategies though larger managers with specialized deal flow remain of interest. IMD will continue to monitor Europe for a favorable reentry point. IMD's pacing plan calls for $550M in commitments for 2014, with an additional $50M carried over from 2013.

CURRENT PORTFOLIO POSTURE: UNDERWEIGHT * vs. SAA target*in program funding/build-out phase

COMMODITIES

Primary Market Metrics & Indicators:

1. Fundamentals: **NEGATIVE**
   - The Fed continued to taper its QE program by $10B per month and reiterated that inflation continues to run below the FOMC's long-term objective.
   - Recent data indicates the US economy has momentum, although the winter weather has impeded progress. Excluding exogenous factors, most commodity sectors appear well supplied, particularly for the current global slow growth environment.
   - Ags planting season has gone well as 95% of corn is planted with 76% of the crop rated good/excellent, both metrics in-line with or ahead of last year and a similar story for soybeans. Energy markets reflect the continued growth in US production, although geopolitical events in Ukraine/Russia have kept prices up. Metals have been mixed as precious metals have benefitted from a flight to safety while industrial metals still exhibit weak demand.
2. Valuations: **NEUTRAL**
   - After being range bound from 245 – 260 in 2H 2013, the index has rose to 270 in Q1 2014 and has remained flat during Q2.
   - Year-to-date, coffee, nickel, and hogs have been the leaders with copper and lead being the biggest laggards.
   - The index on a year-to-date basis is up 6.6%, largely on cold winter weather and geopolitical concerns (ags & energy) and flight to safety (precious metals).
3. Sentiment: **NEUTRAL**
   - The improvement in macroeconomic sentiment in the U.S. year-to-date has softened while EM continues to exhibit weakness and resulted in modest inflows into commodities.
   - Exogenous shocks have pushed up specific commodities in energy and ags although demand has largely not driven prices.
   - Looking across the individual commodities, most remain well supplied, which has been reflected in prices as inflationary fears have abated.

Commentary:

IMD maintained a tactical underweight position relative to the SAAP during 2013 and into 2014 after recognizing the potential effects of Fed tapering and Chinese transition. IMD recognizes that Fed tapering will be data dependent but the Fed has been clear about its intention to reduce stimulus. China's transition to a more consumer oriented economy will be gradual but the era of infrastructure build-out which fueled a portion of the demand for commodities is abating.

IMD will closely monitor the growth and inflation dynamics globally with improving economic conditions and inflationary pressures serving as a catalyst which may initiate a neutral position.

CURRENT PORTFOLIO POSTURE: UNDERWEIGHT vs. SAA target

OPPORTUNISTIC INVESTMENTS

IMD continues to monitor and assess co-investment flow from real estate, private equity and debt managers for select opportunistic equity investments in idiosyncratic opportunities with favorable capital market dynamics. Opportunistic investments are tactical in nature AND are outside ASRS SAAP benchmarks or are absolute return oriented.

CURRENT PORTFOLIO POSTURE: APPROX 3.2% of ASRS TOTAL MARKET VALUE

GLOSSARY

Commentary: Provides verbiage on 1) the current asset class market environment and possible changes to this environment and 2) ASRS asset class portfolio positioning relative to ASRS SAA policy, its rationale for positioning and anticipated changes which may occur in such positioning.

Current Portfolio Posture: Indicates ASRS asset class position relative to its asset allocation policy weight. "Overweight" indicates an asset class weight is greater than its policy target, "Neutral" indicates an equal weight and "Underweight" indicates a lesser weight than its policy target.

Investment House Views: Synthesizes IMD's current and forward-looking investment perspectives and tactical positioning in asset classes and investment strategies in which the ASRS invests.

Primary Market Metrics and Indicators: Broadly-defined metrics (Fundamentals, Valuations, and Sentiments) applied universally to ASRS asset classes and used collectively to evaluate existing market conditions. Indicators ("Positive," "Neutral" and "Negative") reflect IMD's existing views of these metrics and, in addition to other factors, generally determine the basis for the existing (and possible future changes) to ASRS aggregate portfolio position relative to or within ASRS SAA policy targets.

ASRS INVESTMENT MEETINGS									
2014		Asset Class Committees					Board Committee		Grand Totals
		Private Market Committee (PRIFMC)			Public Market Committee (PUBMC)		Investment Committee (IC)		
Quarter	Month	Dates		Total	Dates	Total	Dates		Total	
1st	January	1/15	1/31	2	1/31	1	1/31		1	9
	February	2/21		1			2/20	2/24	2	
	March	3/24		1	3/27	1				
2nd	April	04/22		1	04/17	1	04/21		1	6
	May	05/12	05/27	3						
		05/28								
	June									
3rd	July									
	August									
	September									
4th	October									
	November									
	December									
Totals				8		3			4	15

PRIVATE MARKETS COMMITTEE (PRIVMC)

04/22/14:

- **Private Equity Program**

  - The Committee approved a $40 million commitment to Lovell Minnick IV, a smaller buyout firm focused on the financial services industry. ASRS analysis shows their performance to generate positive PME, particularly when compared to financial services benchmark.

05/12/14

- **Real Estate Program**

  - The Committee approved a $100 million investment to a separately managed account to invest in residential land pursuant to a strategy previously approved to the Committee. Legal negotiations are pending.

05/27/14

- **Private Equity Program**

  - The Committee approved a $40 million commitment to a small buyout GP. The ASRS has previously invested with the GP thorough their previous fund. Legal negotiations are pending.

  - The Committee approved a $25 million commitment to a venture capital fund. ASRS has previously invested with this GP; this GP is one of a handful of the highest performing Silicon Valley venture capital firms. Legal negotiations are pending.

05/28/14

- **Niche and Tactical Real Estate Investments**

  - The Committee was presented with the following investments for preliminary review and approved additional due diligence for each investment:
    - Related companies energy fields housing
    - Cornerstone/LAZ parking assets
    - L3 Capital urban retail
    - Buchanon Street growth market office
    - Hines/Pearlmark San Mate office project

04/17/14:

- **Public Fixed Income Program**

  - The Committee approved the termination of PIMCO core fixed income mandate of approximately $300 million due to myriad of factors that hindered the fund's performance. Funds will remain in fixed income and will be redeployed at the discretion of the CIO.
  - The Committee approved the termination of the Shenkman high yield mandate of approximately $170 million due to performance considerations and decided to redeploy the funds to private opportunistic debt mandates with expected higher returns.

TACTICAL PORTFOLIO POSITIONING

Per approval by the Public Markets Committee, IMD released three (3) non-US equity managers Aberdeen, Hansberger Global Investors and Walter Scott (due to performance issues) and replaced them with three (3) non-US equity managers whose strategy and investment process are expected to provide excess returns and a better in aggregation risk profile within the ASRS non-US equity asset. BlackRock will assist in transitioning the portfolios; completion is expected to occur before the end of June.

Due to concerns about personnel and processes, an active core fixed income mandate with PIMCO with approximately $300 million of assets was terminated and transitioned into Blackrock US Debt Index Fund, a passive strategy.

Due to near all-time tight spread in high yield and House Views to further underweight high yield relative to policy, Shenkman with approximately $170 million of assets was defunded. The funds were used for capital calls in private and opportunistic debt.

The CIO will discuss this tactical portfolio repositioning in more detail at the IC meeting.

Note: tactical portfolio positioning is captured in the ASRS Asset Allocation report; the performance results of tactical positioning (vs. policy targets) are reflected in the ASRS Quarterly Total Fund Performance Attribution Analysis.

IMD (INVESTMENT MANAGEMENT DIVISION) ACTIVITIES, PROJECTS AND RESEARCH INITIATIVES

- The Director and CIO are evaluating methodologies and the structural frameworks for a new asset allocation study which is expected to be completed in calendar year 2014. Separately but related, IMD continues to explore various attribution methodologies which enhance ASRS measuring the effects of internal and external TAA decisions.

- Implementation of the redesigned ASRS securities lending program is pending final contract negotiations with State Street. The program will include two parts: 'base lending' to initiate a conservative strategic lending program and 'opportunistic lending' to profit from relatively large or one-off individual lending transactions, the latter of which will be evaluated and approved on a case-by-case basis by the Director and CIO. The ASRS is currently investigating two opportunistic short term loans of ASRS treasury holdings (approx. $1 billion in aggregate) which is expected to generate net revenue to the ASRS of approximately $250K per month.

- IMD is evaluating enhanced cash management options intended to mitigate potential cash drag on total fund returns and to more efficiently manage monthly internal and external cash flow requirements and their affect the public fixed and equity portfolios. Paramount is to ensure that excess cash balances maintain exposure to equity or fixed income markets while providing ample liquidity to meet pension funding needs and minimizing associated transaction costs. Implementation is expected to occur in Q3-14.

- An IC/IMD Investment Roundtable is scheduled for August 18 which will focus on the following interrelated topics: Equity Risk Factors, Smart Beta Constructs and New/Alternative Beta/Alpha Investment Strategies. Participation will include both internal and external subject matter expects who will provide their perspectives on the agenda topics.

- As a standard course of business, IMD meets with both incumbent and potential investment managers to discuss macro-economies and capital markets as well as providing a means to review new initiatives, relationships and new strategy offerings. Since the last IC meeting, IMD has met via conference call or in-person with a total of 95 investment managers: Private markets (RE, PE, Debt) – 61 and Public markets (Equity and Debt) – 34.

- IMD internally manages 7 public equities and fixed income portfolios which had an aggregate market value of over $9.8 billion or 30% of Total Fund. For the 1-year ending May 31, 3 of 7 met or exceeded their benchmarks, and 7 of 7 portfolios met or exceeded their benchmarks on an inception-to-date basis. For the former noted period, portfolios' underperformance were minor, within TE parameters and mostly applicable to various settlement and operational issues in calendar year 2014.

NEPC, LLC

To: Mr. Tom Manos, Chair, Arizona State Retirement System (ASRS) Board

From: Mr. Allan Martin, Partner, Consultant, NEPC

Mr. Dan LeBeau, Consultant, NEPC

Date: June 17, 2014

Subject: Agenda Item #8: Presentation, Discussion and Appropriate Action Regarding Independent Reporting, Monitoring and Oversight of the ASRS Investment Program – Includes Total Fund Q1-14

Purpose

To present and discuss information regarding the independent reporting, monitoring and oversight of the ASRS Investment Program.

Recommendation

Informational only; no action required.

Background

NEPC is responsible for providing an independent reporting, monitoring and oversight function from the Investment Program information which is presented by the CIO and IMD.

As a result, NEPC has developed reports for both the Investment Committee and Board designed to 1) provide the appropriate level of investment information for the purposes of independent oversight (ASRS SAAP compliance, Asset Class Committee minutes review, investment selection due diligence packet compliance, etc.); 2) provide ASRS investment program performance relative to its goals/objectives (presented quarterly); and 3) communicate NEPC's perspectives on the market environment, investment outlook or other initiatives or topics they believe are important to convey to the Board.

As of March 31, 2014, The Total Fund's market value was approximately $33.7 billion.

For the one-year period ending March 31, 2014, the Total Fund returned 13.8% (net of fees), underperforming the Interim SAA Policy by 0.1%. For the three-year period, the Total Fund produced a return of 9.6% per annum, outperforming the Interim SAA Policy by 0.1%. Over the past ten years, the Total Fund has returned 7.0% per annum, and since inception, the portfolio's performance is 10.0%.

NEPC will provide a review of Total Fund performance and an independent assessment of the ASRS investment program.

Attachments:

- NEPC's Independent Reporting, Monitoring and Oversight reports

Arizona State Retirement System

Independent ASRS Investment Program Oversight for the Period Ending March 31, 2014

June 27, 2014

Allan Martin, Partner, NEPC
Dan LeBeau, Consultant, NEPC

NEPC, LLC

Contents

- ASRS Investment Objectives/Performance
- Independent Oversight/Compliance
  - SAA Policy Compliance
  - Total Fund and Asset Class Analysis
  - Asset Class Committee Monitoring
- Market Environment Update and Outlook
- Appendix: SAA Policy History

ASRS Investment Objectives/Performance

Note: All of the data shown on the following pages is as of March 31, 2014 and reflects the deduction of investment manager fees, unless otherwise noted.

ASRS Investment Objectives

Macro

- Objective #1: Achieve a twenty-year rolling annual total fund net rate of return equal to or greater than the actuarial assumed interest rate.
- Objective #2: Achieve one- and three-year rolling annual total fund net rates of return equal to or greater than the return of the ASRS Strategic Asset Allocation Policy (SAAP) Benchmark.
- Objective #3: Achieve one- and three-year rolling annual net rates of return for ASRS strategic asset classes that are equal to or greater than their respective strategic asset class benchmarks.
- Objective #4: Ensure sufficient monies are available to meet pension benefits, health insurance, member refunds, administrative payments, and other cash flow requirements.

Micro

Source: ASRS Strategic Plan, March 2013

Total Fund Performance

- Objective #1: Achieve a twenty-year rolling annual total fund net rate of return equal to or greater than the actuarial assumed interest rate.

	20 Year Annualized Return
Total Fund	8.6%
Constant 8%	8.0%
Excess Return	0.6%

Goal Met: Yes

Total Fund Performance

- Objective #2: Achieve one- and three-year rolling annual total fund net rates of return equal to or greater than the return of the ASRS Strategic Asset Allocation Policy (SAAP) Benchmark.

	Quarter	**1 Year**	**3 Years**	5 Years	10 Years	Since Inception (6/30/75)
Total Fund	2.3%	**13.8%**	**9.6%**	15.9%	7.0%	10.0%
Interim SAA Policy[1]	2.4%	**13.9%**	**9.5%**	15.7%	6.9%	9.8%
Excess Return	-0.1%	**-0.1%**	**0.1%**	0.2%	0.1%	0.2%

1 Year Goal Met: No
3 Year Goal Met: Yes

[1]Composition of SAA Policy can be found in the appendix.

Total Fund Attribution Analysis

Total Plan	1 Year	3 Years	5 Years
Allocation Effect[1]	1.08%	0.27%	0.07%
Manager Selection Effect[2]	-1.34%	-0.19%	0.03%
Interaction Effect[3]	0.11%	0.08%	0.24%
Residual[4]	0.06%	-0.02%	-0.10%
Excess Return	**-0.09%**	**0.14%**	**0.24%**

The Brinson-Fachler Attribution model explains excess return by identifying the size of contributors or detractors from excess return based on the three effects defined below:

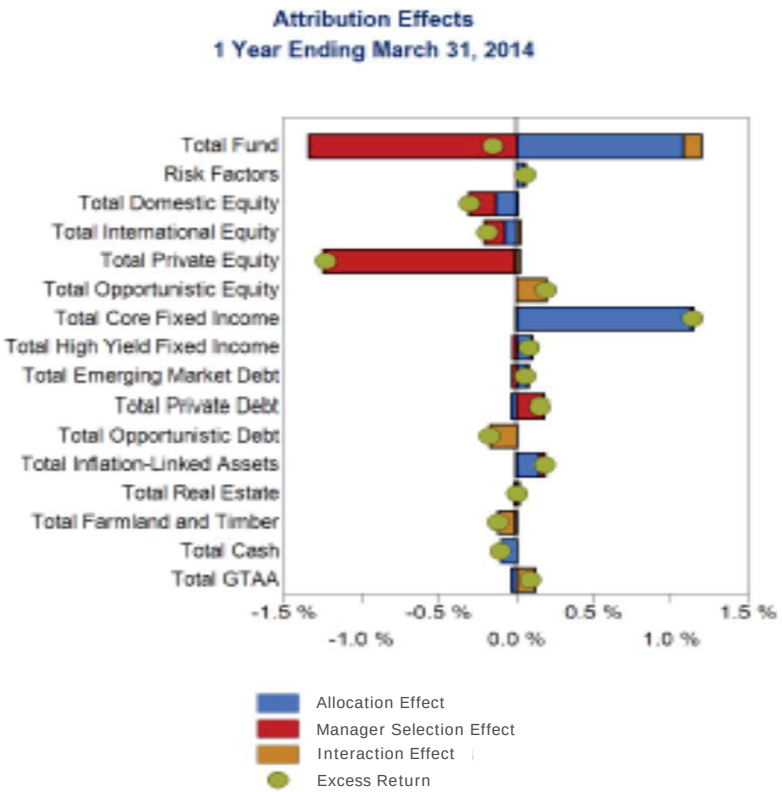
1. Allocation Effect: Measures the impact of the decision to over/under weight assets classes relative to Interim SAAP weights**.** (Return Asset Class Index – Total Interim Policy Index Return) × (Weight Asset Class Portfolio – Weight Asset Class Interim Policy Index)

2. Manager Selection Effect: Measures the impact of over/under performance of asset classes in the portfolio relative to the asset class benchmarks in the Interim SAAP benchmark. [Weight Asset Class Benchmark × (Return Portfolio Asset Class – Return Asset Class in Interim Policy Index)]

3. Interaction Effect: Measures the impact of over/under weighting decisions and over/under performance. (Return Asset Class Portfolio (Weight Asset Class Portfolio – Weight Asset Class Policy Index))–(Return Asset Class Index (Weight Asset Class Portfolio – Weight Asset Class Index))

4. Residual: Contribution to excess return not captured in Allocation Effect, Manager Selection Effect and Interaction Effect.

Total Fund Attribution Detail



1 Year Excess Return: -0.09%

- Allocation Effect: +1.08%
  - Public Markets Fixed Income tactical underweight (+1.30%)
  - Commodities tactical underweight (+0.15%)
  - Domestic Equity tactical underweight (-0.14%)
  - International Equity tactical underweight (-0.08%)
- Manager Selection Effect: -1.34%
  - Private Equity underperformed due to various managers (-1.23%)
  - Domestic Equity underperformed due to small cap managers (-0.17%)
  - Private Debt outperformed due to various managers (+0.18%)
- Interaction Effect: +0.11%
  - Opportunistic Equity outperformed due to various managers (+0.19%)
  - GTAA outperformed due to Bridgewater (+0.12%)
  - Opportunistic Debt underperformed due to various managers (-0.17%)
- Residual: 0.06%

The Brinson-Fachler Attribution model explains excess return by identifying the size of contributors or detractors from excess return based on the three effects defined below:

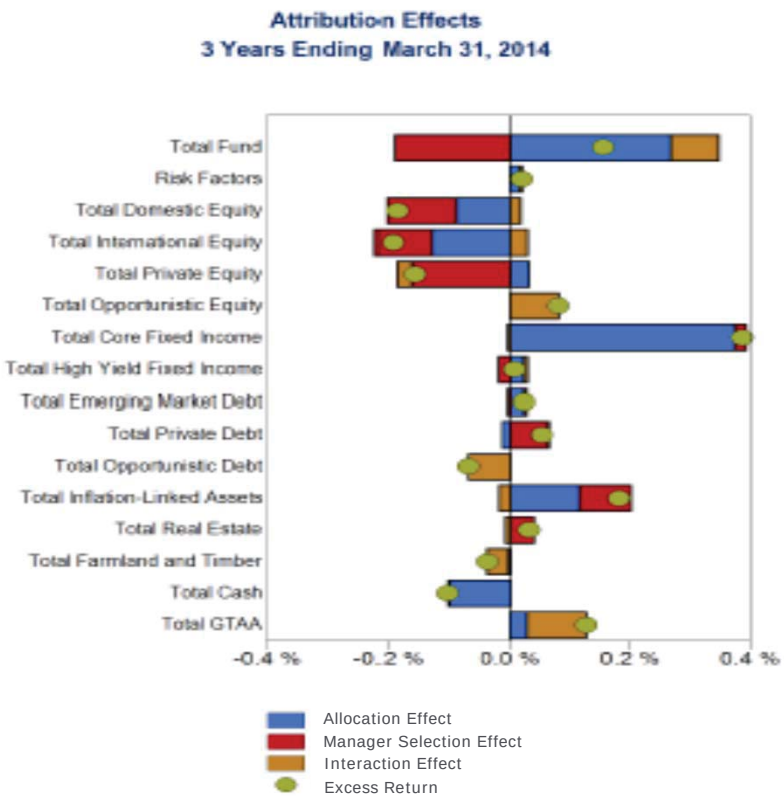
Allocation Effect: Measures the impact of the decision to over/under weight assets classes relative to Interim SAAP benchmark weights**.** (Return Asset Class Index – Total Interim Policy Index Return) × (Weight Asset Class Portfolio – Weight Asset Class Interim Policy Index)

Manager Selection Effect: Measures the impact of over/under performance of asset classes in the portfolio relative to the asset class benchmarks in the Interim SAAP benchmark. [Weight Asset Class Benchmark × (Return Portfolio Asset Class – Return Asset Class in Interim Policy Index)]

Interaction Effect: Measures the impact of over/under weighting decisions and over/under performance. (Return Asset Class Portfolio (Weight Asset Class Portfolio – Weight Asset Class Policy Index))–(Return Asset Class Index (Weight Asset Class Portfolio – Weight Asset Class Index))

Residual: Contribution to excess return not captured in Allocation Effect, Manager Selection Effect and Interaction Effect.

Total Fund Attribution Detail



3 Year Excess Return: +0.14%

- Allocation Effect: +0.27%
  - Public Markets Fixed Income tactical underweight (+0.41%)
  - Commodities tactical underweight (+0.12%)
  - International Equity tactical underweight (-0.13%)
- Manager Selection Effect: -0.19%
  - Private Equity underperformed due to various managers (-0.17%)
  - Domestic Equity underperformed due to various managers (-0.11%)
  - International Equity underperformed due to various managers (-0.09%)
  - Commodities outperformed due to Gresham (+0.08%)
- Interaction Effect: +0.08%
  - GTAA outperformed due to Bridgewater (+0.10%)
  - Opportunistic Equity outperformed due to various managers (+0.08%)
  - Opportunistic Debt underperformed due to various managers (-0.07%)
- Residual: -0.02%

The Brinson-Fachler Attribution model explains excess return by identifying the size of contributors or detractors from excess return based on the three effects defined below:

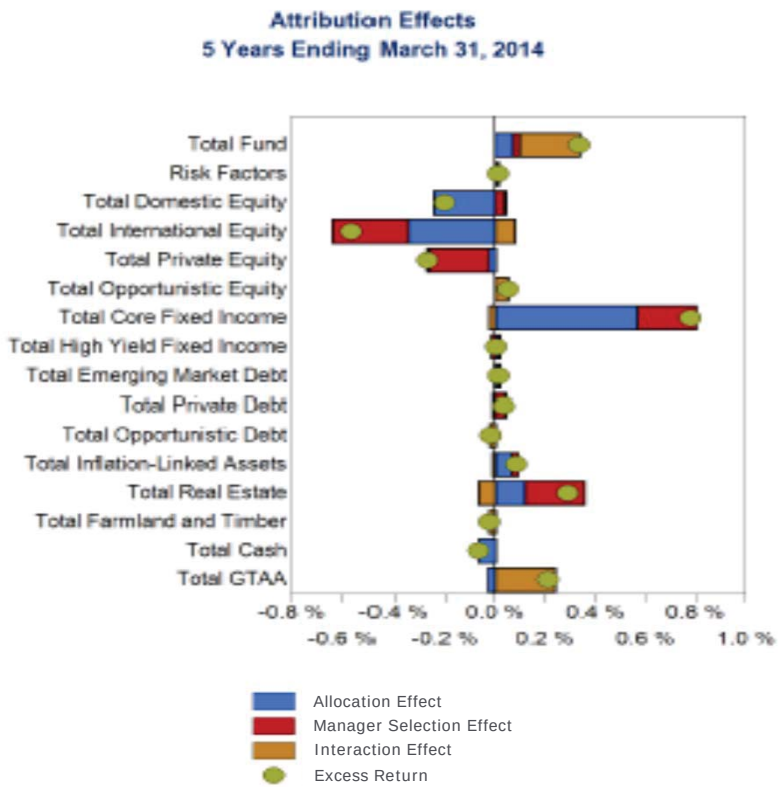
Allocation Effect: Measures the impact of the decision to over/under weight assets classes relative to Interim SAAP benchmark weights**.** (Return Asset Class Index – Total Interim Policy Index Return) × (Weight Asset Class Portfolio – Weight Asset Class Interim Policy Index)

Manager Selection Effect: Measures the impact of over/under performance of asset classes in the portfolio relative to the asset class benchmarks in the Interim SAAP benchmark. [Weight Asset Class Benchmark × (Return Portfolio Asset Class – Return Asset Class in Interim Policy Index)]

Interaction Effect: Measures the impact of over/under weighting decisions and over/under performance. (Return Asset Class Portfolio (Weight Asset Class Portfolio – Weight Asset Class Policy Index))–(Return Asset Class Index (Weight Asset Class Portfolio – Weight Asset Class Index))

Residual: Contribution to excess return not captured in Allocation Effect, Manager Selection Effect and Interaction Effect.

Total Fund Attribution Detail



5 Year Excess Return: +0.24%

- Allocation Effect: +0.07%
  - Public Markets Fixed Income tactical underweight (+0.59%)
  - Real Estate underweight (+0.12%)
  - International Equity tactical underweight (-0.35%)
  - Domestic Equity tactical underweight (-0.24%)
- Manager Selection Effect: +0.03%%
  - Public Markets Fixed Income outperformed due to various managers (+0.24%)
  - Real Estate outperformed due to various managers (+0.24%)
  - International Equity underperformed due to various managers (-0.29%)
  - Private Equity underperformed due to various managers (-0.24%)
- Interaction Effect: +0.24%
  - GTAA outperformed due to Bridgewater (+0.24%)
- Residual: -0.10%

The Brinson-Fachler Attribution model explains excess return by identifying the size of contributors or detractors from excess return based on the three effects defined below:

Allocation Effect: Measures the impact of the decision to over/under weight assets classes relative to Interim SAAP benchmark weights**.** (Return Asset Class Index – Total Interim Policy Index Return) × (Weight Asset Class Portfolio – Weight Asset Class Interim Policy Index)

Manager Selection Effect: Measures the impact of over/under performance of asset classes in the portfolio relative to the asset class benchmarks in the Interim SAAP benchmark. [Weight Asset Class Benchmark × (Return Portfolio Asset Class – Return Asset Class in Interim Policy Index)]

Interaction Effect: Measures the impact of over/under weighting decisions and over/under performance. (Return Asset Class Portfolio (Weight Asset Class Portfolio – Weight Asset Class Policy Index))–(Return Asset Class Index (Weight Asset Class Portfolio – Weight Asset Class Index))

Residual: Contribution to excess return not captured in Allocation Effect, Manager Selection Effect and Interaction Effect.

Asset Class Performance vs. Benchmark – Public Markets

- Objective #3: Achieve one- and three-year rolling annual net rates of return for ASRS strategic asset classes that are equal to or greater than their respective strategic asset class benchmarks.

	1 Year Return	3 Year Return
ASRS Total Domestic and Int'l Equity[1]	18.5%	11.2%
ASRS Custom Total Equity Benchmark	18.8%	11.5%
Excess Return	-0.3%	-0.3%
ASRS Domestic Equity	22.1%	14.3%
ASRS Custom Domestic Equity Benchmark	22.7%	14.7%
Excess Return	-0.6%	-0.4%
ASRS International Equity	12.9%	5.2%
ASRS Custom Int'l Equity Benchmark	13.4%	5.4%
Excess Return	-0.5%	-0.2%
ASRS Public Markets Fixed Income	-0.3%	4.3%
ASRS Custom Fixed Income Benchmark	0.4%	4.3%
Excess Return	-0.7%	0.0%
ASRS Inflation-Linked	-1.3%	-5.2%
ASRS Custom Inflation-Linked Benchmark	-2.1%	-6.9%
Excess Return	0.8%	1.7%
ASRS GTAA	14.6%	10.6%
ASRS Custom GTAA Benchmark	13.6%	9.7%
Excess Return	1.0%	0.9%

[1]Performance of ASRS Total Domestic and Int'l Equity includes the performance of the ASRS Domestic Equity and ASRS International Equity asset classes and the Equity Risk Factor Portfolio with an inception date of 6/1/2013.

Note: Composition of ASRS Custom Asset Class Benchmarks can be found in the appendix.

Goal Met: Partially

Asset Class Performance vs. Benchmark – Private Markets[1]

- Objective #3: Achieve one- and three-year rolling annual net rates of return for ASRS strategic asset classes that are equal to or greater than their respective strategic asset class benchmarks.

	1 Year Return	3 Year Return	IRR Since Inception	Inception Date
ASRS Private Equity	15.0%	15.4%	12.9%	Oct-07
Russell 2000	38.8%	15.7%	17.3%	
Excess Return	-23.8%	-0.3%	-4.4%	
ASRS Opportunistic Equity[2]	43.5%	--	40.7%	Apr-11
ASRS Private Debt	17.8%	--	17.2%	Jul-12
S&P/LSTA Levered Loan Index + 250 bps	7.8%	--	8.4%	
Excess Return	10.0%	--	8.8%	
ASRS Opportunistic Debt[2]	8.4%	8.5%	12.1%	Jan-08
ASRS Real Estate	13.2%	13.2%	5.6%	Oct-05
NFI - ODCE Index	12.9%	12.5%	4.8%	
Excess Return	0.3%	0.7%	0.8%	
ASRS Farmland and Timber	--	--	1.1%	Jul-13
CPI ex-Food and Energy + 350 bps	--	--	1.2%	
Excess Return	--	--	-0.1%	

[1]Performance of private markets portfolios and corresponding benchmarks is reported on a one quarter lag. Performance shown as of December 31, 2013.

[2]Net absolute rate of return expectations range from 10-14% per annum.

Note: Time-weighted performance of private markets portfolios shown for the one- and three-year periods to reconcile Total Fund performance as it is reported on a time-weighted basis. Due to the drawdown nature of private markets portfolios in which the investment managers call capital over time, dollar-weighted performance, or internal rate of return (IRR) is a more appropriate measure of the performance of ASRS private markets portfolios.

Goal Met: Partially

Cash Management

- Objective #4: Ensure sufficient monies are available to meet pension benefits, health insurance, member refunds, administrative payments, and other cash flow requirements.

Month	Cash In	Cash Out	Balance as of 1st Business Day
Apr-13	$223,752,576	($182,003,067)	$65,075,125
May-13	$466,869,533	($182,469,344)	$285,187,177
Jun-13	$357,254,932	($182,835,622)	$212,223,877
Jul-13	$490,407,958	($185,679,872)	$307,287,872
Aug-13	$364,853,179	($188,310,189)	$205,962,942
Sep-13	$303,470,007	($189,505,809)	$95,194,585
Oct-13	$404,897,845	($190,046,089)	$200,202,122
Nov-13	$213,012,636	($190,661,495)	$126,730,318
Dec-13	$560,544,992	($190,590,864)	$317,630,570
Jan-14	$386,764,591	($190,949,369)	$352,809,530
Feb-14	$210,787,413	($191,680,149)	$189,010,112
Mar-14	$679,587,225	($192,454,469)	$486,243,101

All Pension Obligations, Capital Calls and Other Requirements Met with Available Cash

Goal Met: Yes

Note:

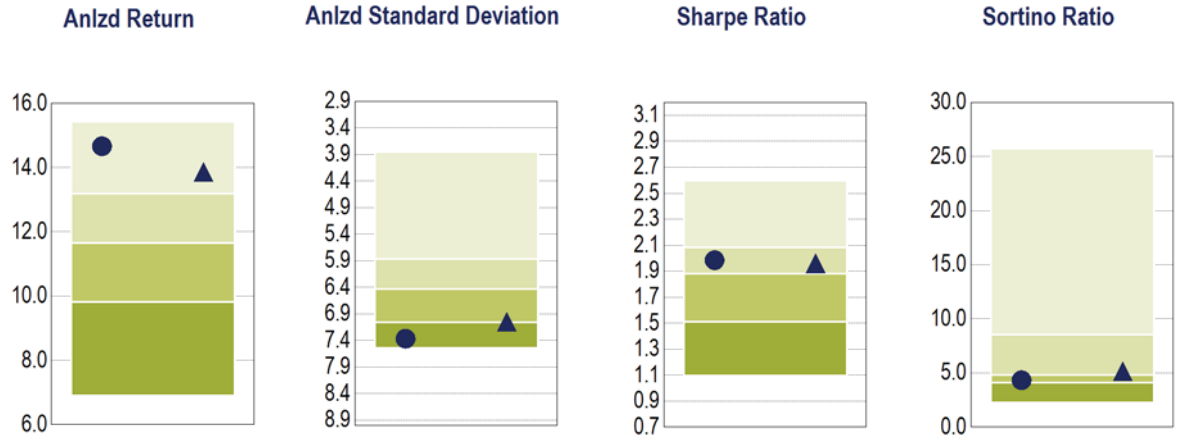
Cash In - The balance as of the business day prior to the monthly pension run payment, comprised of month-to-date contributions and excess cash held to fund manager(s) or as a tactical allocation.

Cash Out - The monthly pension run payment.

Total Fund Risk Statistics vs. Peer Universe

Total Fund vs. IFx Public DB > $1B Gross(USD)(peer)

1 Year



	Anlzd Return	Anlzd Standard Deviation	Sharpe Ratio	Sortino Ratio
● Total Fund				
Value	14.7	7.4	2.0	4.3
%tile	12	91	37	69
▲ Interim SAA Policy				
Value	13.9	7.1	2.0	5.1
%tile	18	78	39	43
Universe				
5th %tile	15.4	3.9	2.6	25.7
25th %tile	13.2	5.9	2.1	8.6
Median	11.7	6.4	1.9	4.9
75th %tile	9.8	7.0	1.5	4.1
95th %tile	6.9	7.5	1.1	2.3

Note: The information contained herein is for comparison purposes only and is not a Total Fund benchmark. Peer universe comparisons are subject to several limitations, including: peer groups are not comprehensive; several funds are included in multiple peer groups; peer groups are constructed using gross of fee returns; and survivorship bias in that poorly performing funds may not longer report results.

Universes are constructed using gross of fee returns; therefore, ASRS rank is based on gross of fee returns.

Rankings are from highest (1) to lowest (100) in the InvestorForce Public Funds > $1 Billion Universe.

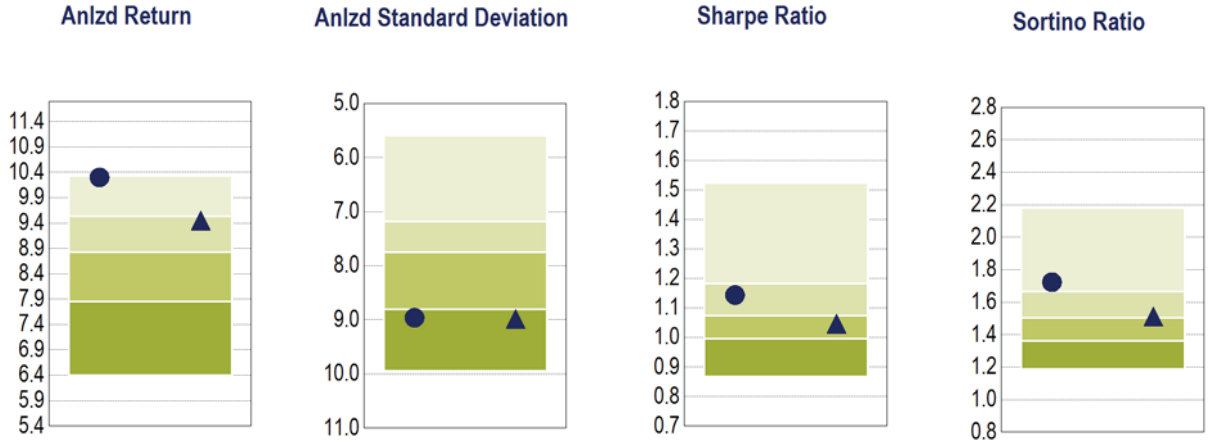
The InvestorForce Public Funds > $1 Billion Universe contains 56 observations for the one-year period ending March 31, 2014, with total assets of $512.8 billion.

Composition of Interim SAA Policy can be found in the appendix.

Total Fund Risk Statistics vs. Peer Universe

Total Fund vs. IFx Public DB > $1B Gross(USD)(peer)

3 Year



	Anlzd Return	Anlzd Standard Deviation	Sharpe Ratio	Sortino Ratio
● Total Fund				
Value	10.3	9.0	1.1	1.7
%tile	6	81	30	20
▲ Interim SAA Policy				
Value	9.5	9.0	1.0	1.5
%tile	28	81	58	49
Universe				
5th %tile	10.3	5.6	1.5	2.2
25th %tile	9.5	7.2	1.2	1.7
Median	8.8	7.7	1.1	1.5
75th %tile	7.9	8.8	1.0	1.4
95th %tile	6.4	9.9	0.9	1.2

Note: The information contained herein is for comparison purposes only and is not a Total Fund benchmark. Peer universe comparisons are subject to several limitations, including: peer groups are not comprehensive; several funds are included in multiple peer groups; peer groups are constructed using gross of fee returns; and survivorship bias in that poorly performing funds may not longer report results.

Universes are constructed using gross of fee returns; therefore, ASRS rank is based on gross of fee returns.

Rankings are from highest (1) to lowest (100) in the InvestorForce Public Funds > $1 Billion Universe.

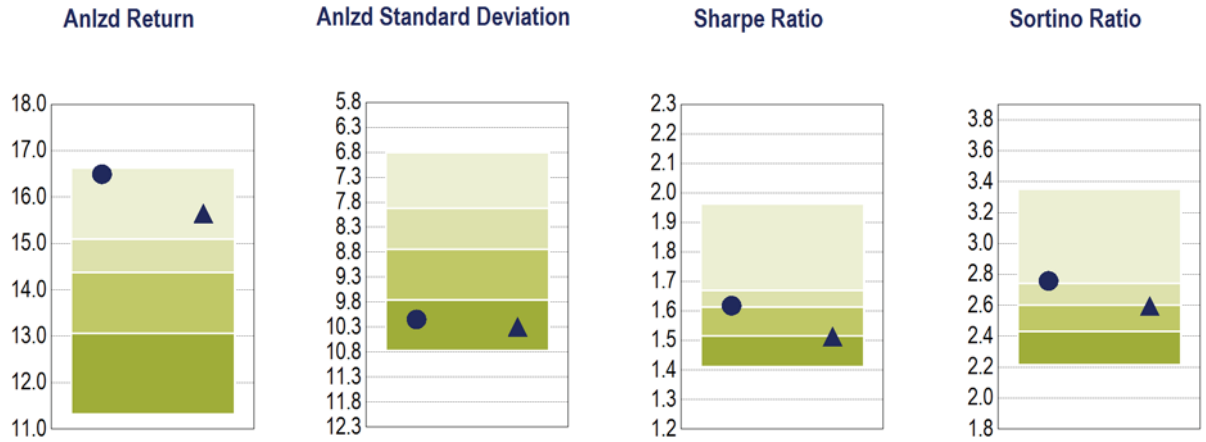
The InvestorForce Public Funds > $1 Billion Universe contains 56 observations for the three-year period ending March 31, 2014, with total assets of $512.8 billion.

Composition of Interim SAA Policy can be found in the appendix.

Total Fund Risk Statistics vs. Peer Universe

Total Fund vs. IFx Public DB > $1B Gross(USD)(peer)

5 Year



	Anlzd Return	Anlzd Standard Deviation	Sharpe Ratio	Sortino Ratio
● Total Fund				
Value	16.5	10.1	1.6	2.8
%tile	6	83	48	25
▲ Interim SAA Policy				
Value	15.7	10.3	1.5	2.6
%tile	17	84	77	53
Universe				
5th %tile	16.6	6.8	2.0	3.3
25th %tile	15.1	7.9	1.7	2.7
Median	14.4	8.7	1.6	2.6
75th %tile	13.1	9.7	1.5	2.4
95th %tile	11.3	10.8	1.4	2.2

Note: The information contained herein is for comparison purposes only and is not a Total Fund benchmark. Peer universe comparisons are subject to several limitations, including: peer groups are not comprehensive; several funds are included in multiple peer groups; peer groups are constructed using gross of fee returns; and survivorship bias in that poorly performing funds may not longer report results.

Universes are constructed using gross of fee returns; therefore, ASRS rank is based on gross of fee returns.

Rankings are from highest (1) to lowest (100) in the InvestorForce Public Funds > $1 Billion Universe.

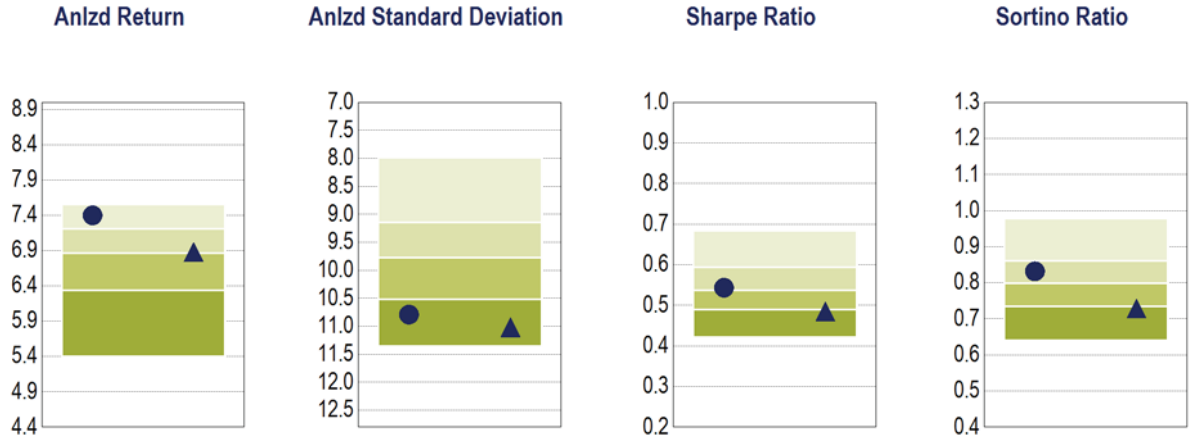
The InvestorForce Public Funds > $1 Billion Universe contains 56 observations for the five-year period ending March 31, 2014, with total assets of $512.8 billion.

Composition of Interim SAA Policy can be found in the appendix.

Total Fund Risk Statistics vs. Peer Universe

Total Fund vs. IFx Public DB > $1B Gross(USD)(peer)

10 Year



	Anlzd Return	Anlzd Standard Deviation	Sharpe Ratio	Sortino Ratio
● Total Fund				
Value	7.4	10.8	0.5	0.8
%tile	11	84	49	38
▲ Interim SAA Policy				
Value	6.9	11.0	0.5	0.7
%tile	50	89	77	77
Universe				
5th %tile	7.5	8.0	0.7	1.0
25th %tile	7.2	9.1	0.6	0.9
Median	6.9	9.8	0.5	0.8
75th %tile	6.3	10.5	0.5	0.7
95th %tile	5.4	11.3	0.4	0.6

Note: The information contained herein is for comparison purposes only and is not a Total Fund benchmark. Peer universe comparisons are subject to several limitations, including: peer groups are not comprehensive; several funds are included in multiple peer groups; peer groups are constructed using gross of fee returns; and survivorship bias in that poorly performing funds may not longer report results.

Universes are constructed using gross of fee returns; therefore, ASRS rank is based on gross of fee returns.

Rankings are from highest (1) to lowest (100) in the InvestorForce Public Funds > $1 Billion Universe.

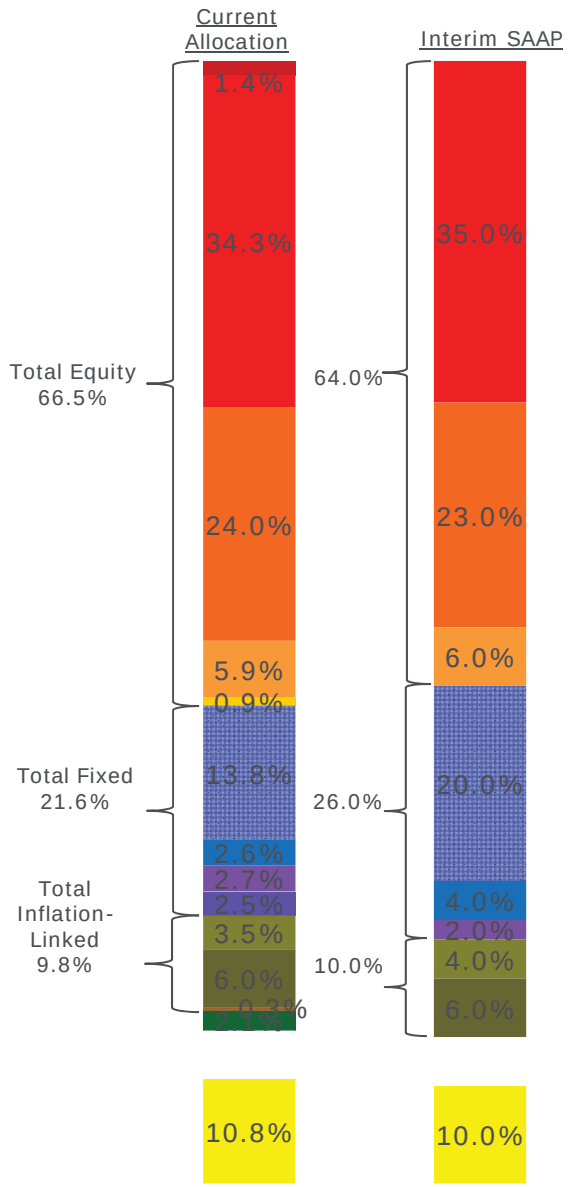
The InvestorForce Public Funds > $1 Billion Universe contains 53 observations for the ten-year period ending March 31, 2014, with total assets of $512.8 billion.

Composition of Interim SAA Policy can be found in the appendix.

Independent Oversight/Compliance

Note: All of the data shown on the following pages is as of March 31, 2014 and reflects the deduction of investment manager fees, unless otherwise noted.

SAA Policy Compliance



	Current Mkt Value	Current Allocation	Interim SAAP	Difference	Policy Range	Within Range
Total Domestic and International Equity[1]	**$20,149,786,746**	**59.8%**	**59.0%**	**0.8%**		
Domestic Equity[3]	**$11,563,664,969**	**34.3%**	**35.0%**	**-0.7%**	**26% - 38%**	**Yes**
U.S. Large Cap[2]	*$8,426,785,387*	*25.0%*	*25.0%*	*0.0%*		
U.S. Mid Cap	*$1,562,975,541*	*4.6%*	*5.0%*	*-0.4%*		
U.S. Small Cap	*$1,573,904,041*	*4.7%*	*5.0%*	*-0.3%*		
International Equity[3]	**$8,099,076,991**	**24.0%**	**23.0%**	**1.0%**	**16% - 28%**	**Yes**
Developed Large Cap[2]	*$4,935,470,654*	*14.6%*	*14.0%*	*0.6%*		
Developed Small Cap	*$1,290,418,965*	*3.8%*	*3.0%*	*0.8%*		
Emerging Markets	*$1,873,187,373*	*5.6%*	*6.0%*	*-0.4%*		
Private Equity[4]	**$1,971,690,807**	**5.9%**	**6.0%**	**-0.1%**	**5% - 9%**	**Yes**
Opportunistic Equity[4,6]	**$289,397,630**	**0.9%**	**0.0%**	**0.9%**	**0% - 3%**	**Yes**
Total Equity	**$22,410,875,183**	**66.5%**	**64.0%**	**2.5%**	**53% - 70%**	**Yes**
U.S. Fixed Income	**$4,658,662,454**	**13.8%**	**20.0%**	**-6.2%**	**8% - 28%**	**Yes**
Core[2]	*$3,430,525,494*	*10.2%*	*15.0%*	*-4.8%*		
High Yield	*$1,228,136,960*	*3.6%*	*5.0%*	*-1.4%*		
Emerging Market Debt	**$880,235,877**	**2.6%**	**4.0%**	**-1.4%**		
Private Debt[4]	**$914,859,250**	**2.7%**	**2.0%**	**0.7%**		
Opportunistic Debt[4,6]	**$835,678,506**	**2.5%**	**0.0%**	**2.5%**	**0% - 10%**	**Yes**
Total Fixed Income	**$7,289,436,087**	**21.6%**	**26.0%**	**-4.4%**	**15% - 35%**	**Yes**
Commodities[2]	**$1,168,169,375**	**3.5%**	**4.0%**	**-0.5%**	**1% - 7%**	**Yes**
Real Estate[2,4]	**$2,038,460,914**	**6.0%**	**6.0%**	**0.0%**	**6% - 10%**	**Yes**
Infrastructure	**$0**	**0.0%**	**0.0%**	**0.0%**	**0% - 3%**	**Yes**
Farmland and Timber[4]	**$95,259,926**	**0.3%**	**0.0%**	**0.3%**	**0% - 3%**	**Yes**
Opportunistic Inflation-Linked[6]	**$0**	**0.0%**	**0.0%**	**0.0%**	**0% - 3%**	**Yes**
Total Inflation-Linked	**$3,301,890,215**	**9.8%**	**10.0%**	**-0.2%**	**8% - 16%**	**Yes**
Cash[5]	**$693,672,800**	**2.1%**	**0.0%**	**2.1%**		
Total	**$33,695,874,285**	**100.0%**	**100.0%**	**0.0%**		
Global Tactical Asset Allocation (GTAA)[2]	**$3,632,165,447**	**10.8%**	**10.0%**	**0.8%**	**5% - 15%**	**Yes**

[1]Total Domestic and International Equity includes Equity Risk Factor Portfolio with assets of $487.0 million.

[2]GTAA allocation distributed into U.S. Large Cap Equity, Int'l Developed Large Cap Equity, Core Fixed Income, Commodities and Real Estate.

[3]Domestic and International Equity market values include residual values remaining in terminated manager accounts.

[4]Values shown for private markets portfolios include cash flows that occurred during 1Q2014.

[5]Cash includes money for the upcoming monthly pension distribution. Value shown also includes assets in liquidating GTAA account.

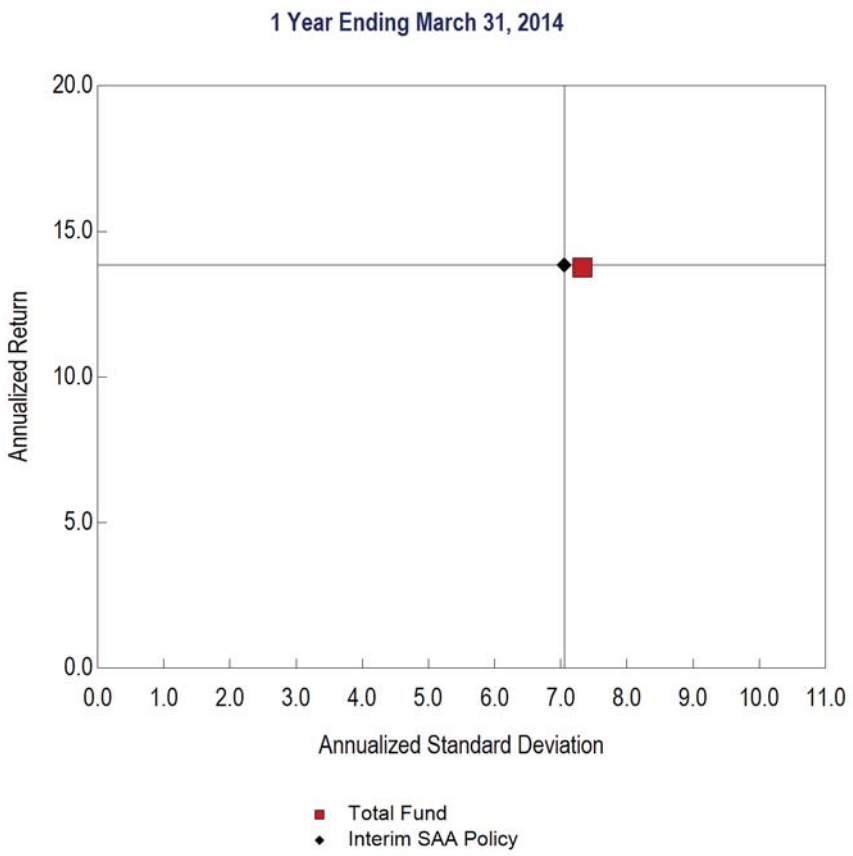
[6]Aggregate Opportunistic asset classes not to exceed 10%.

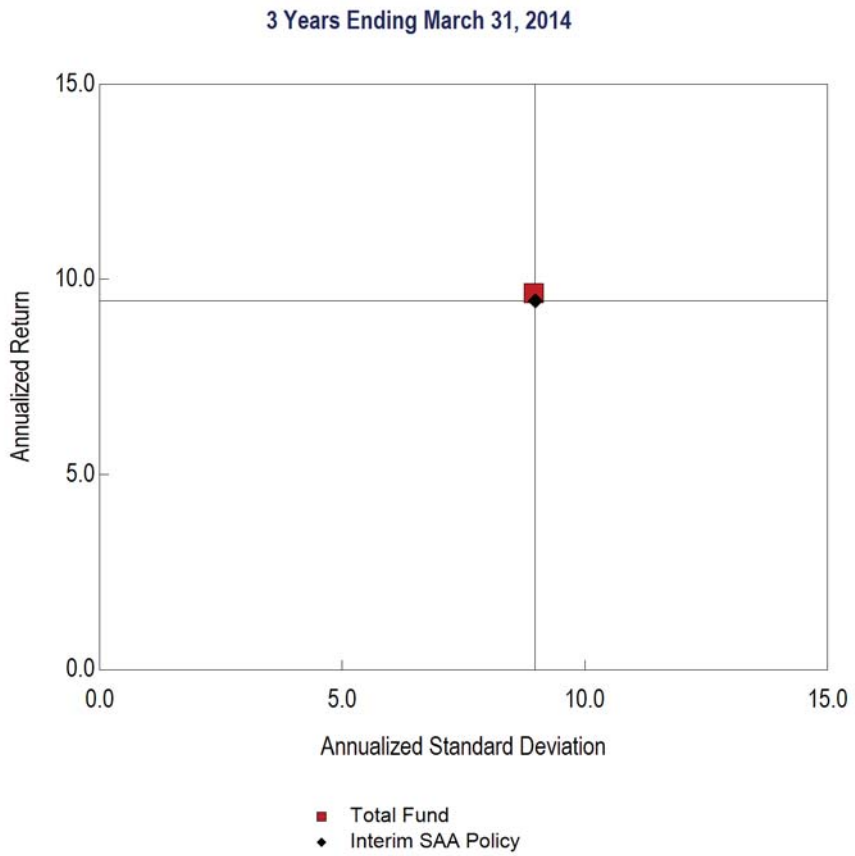
Note: Interim SAA Policy includes proration of 1% Private Equity, 1% Private Debt and 2% Real Estate, which are unfunded.

Policy Ranges shown are relative to the long-term SAAP, causing some asset classes to be out of range while implementation of the long-term SAAP is in process.

Market values include manager held cash.

Total Fund Analysis





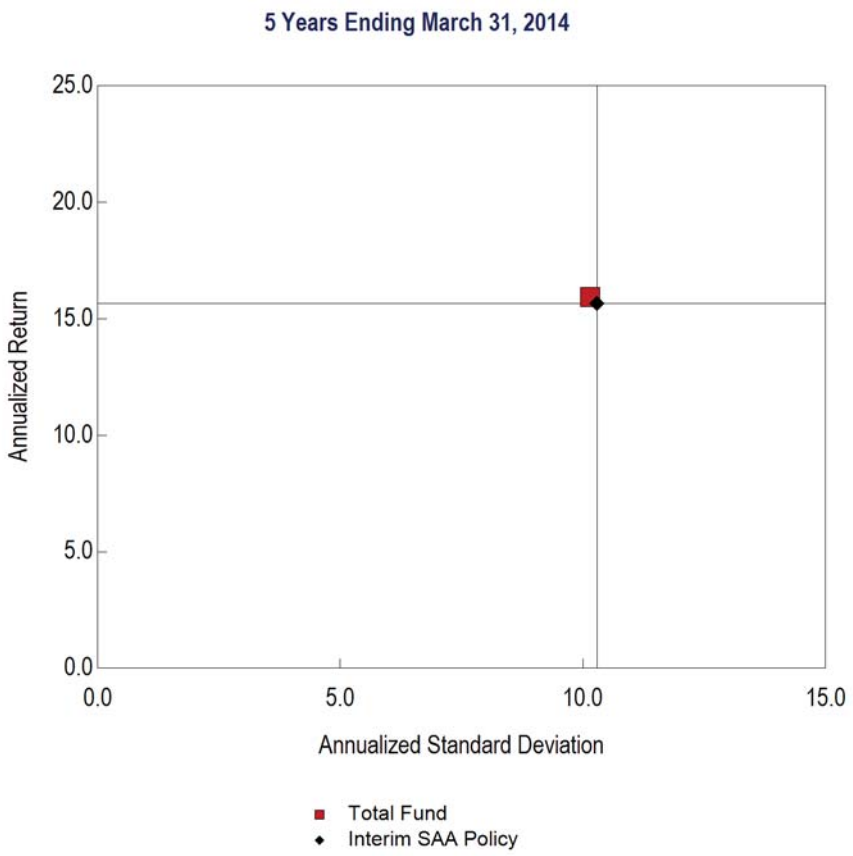
1 Year Ending March 31, 2014

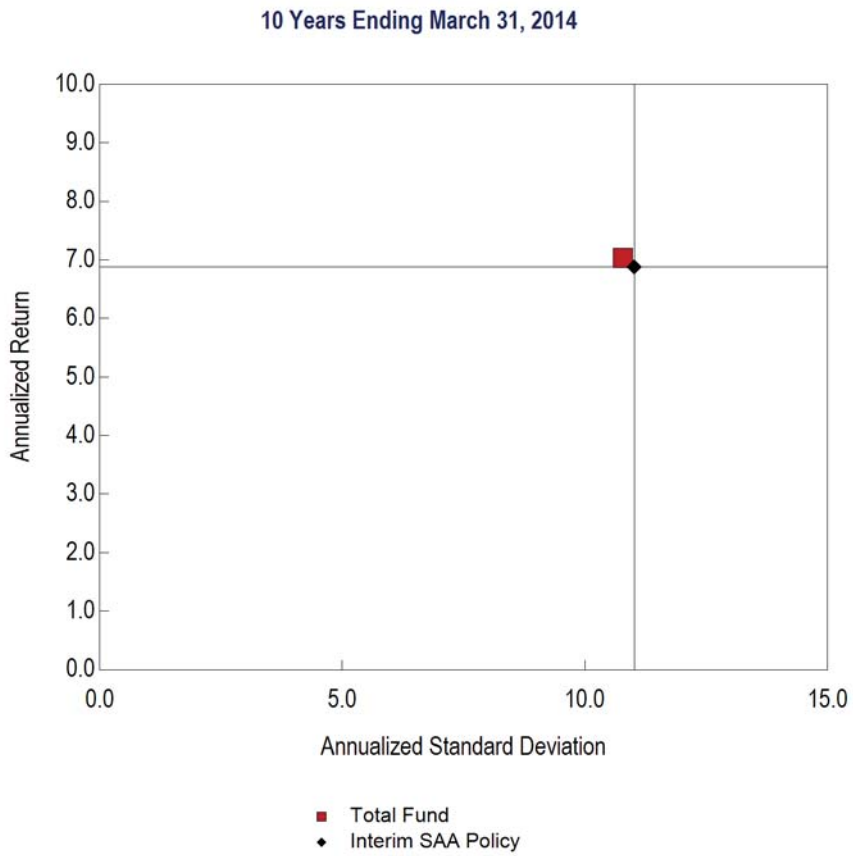
	Anlzd Return	Anlzd Standard Deviation	Sharpe Ratio	Sortino Ratio
Total Fund	13.8%	7.3%	1.9	4.0
Interim SAA Policy	13.9%	7.1%	2.0	5.1

3 Years Ending March 31, 2014

	Anlzd Return	Anlzd Standard Deviation	Sharpe Ratio	Sortino Ratio
Total Fund	9.6%	8.9%	1.1	1.6
Interim SAA Policy	9.5%	9.0%	1.0	1.5

Total Fund Analysis





5 Years Ending March 31, 2014

	Anlzd Return	Anlzd Standard Deviation	Sharpe Ratio	Sortino Ratio
Total Fund	15.9%	10.1%	1.6	2.7
Interim SAA Policy	15.7%	10.3%	1.5	2.6

10 Years Ending March 31, 2014

	Anlzd Return	Anlzd Standard Deviation	Sharpe Ratio	Sortino Ratio
Total Fund	7.0%	10.8%	0.5	0.8
Interim SAA Policy	6.9%	11.0%	0.5	0.7

Asset Class Performance Summary - Public Markets

	Market Value ($)	% of Portfolio	3 Mo (%)	Rank	9 Mo (%)	Rank	1 Yr (%)	Rank	3 Yrs (%)	Rank	5 Yrs (%)	Rank	10 Yrs (%)	Rank	Inception (%)	Since
Total Fund	**33,695,874,285**	**100**	**2.3**	**--**	**13.9**	**--**	**13.8**	**--**	**9.6**	**--**	**15.9**	**--**	**7.0**	**--**	**10.0**	**Jul-75**
Interim SAA Policy			*2.4*	--	*13.8*	--	*13.9*	--	*9.5*	--	*15.7*	--	*6.9*	--	*9.8*	*Jul-75*
Over/Under			-0.1		0.1		-0.1		0.1		0.2		0.1		0.2	
Actual Benchmark			*2.5*	--	*14.4*	--	*14.8*	--	*9.7*	--	*15.2*	--	*6.9*	--	--	*Jul-75*
Total Domestic and International Equity[1]	**18,049,361,124**	**53.6**	**1.5**	**--**	**17.9**	**--**	**18.5**	**--**	**11.2**	**--**	**20.0**	**--**	**7.5**	**--**	**6.9**	**Jan-98**
ASRS Custom Total Equity Benchmark			*1.4*	--	*18.3*	--	*18.8*	--	*11.5*	--	*20.3*	--	*7.6*	--	*6.2*	*Jan-98*
Over/Under			0.1		-0.4		-0.3		-0.3		-0.3		-0.1		0.7	
Total Domestic Equity	**10,458,781,171**	**31.0**	**1.8**	**48**	**19.0**	**63**	**22.1**	**62**	**14.3**	**42**	**22.5**	**49**	**8.3**	**60**	**11.4**	**Jul-75**
ASRS Custom Domestic Equity Benchmark			*1.9*	*45*	*19.4*	*60*	*22.7*	*57*	*14.7*	*36*	*22.4*	*50*	*8.0*	*67*	*11.4*	*Jul-75*
Over/Under			-0.1		-0.4		-0.6		-0.4		0.1		0.3		0.0	
eA All US Equity Net Median			*1.7*		*20.2*		*23.5*		*13.8*		*22.4*		*8.7*		*12.6*	*Jul-75*
Total International Equity	**7,103,535,168**	**21.1**	**1.0**	**34**	**16.3**	**55**	**12.9**	**67**	**5.2**	**70**	**15.2**	**75**	**6.3**	**86**	**6.5**	**Apr-87**
ASRS Custom Int'l Equity Benchmark			*0.8*	*40*	*16.8*	*52*	*13.4*	*65*	*5.4*	*61*	*16.5*	*56*	*7.5*	*66*	*6.2*	*Apr-87*
Over/Under			0.2		-0.5		-0.5		-0.2		-1.3		-1.2		0.3	
eA All ACWI ex-US Equity Net Median			*0.4*		*16.8*		*14.6*		*6.1*		*16.8*		*8.0*		*7.9*	*Apr-87*
Total Public Markets Fixed Income	**4,373,957,134**	**13.0**	**1.9**	**46**	**3.4**	**38**	**-0.3**	**83**	**4.3**	**48**	**6.1**	**49**	**4.9**	**38**	**8.5**	**Jul-75**
ASRS Custom Fixed Income Benchmark			*2.2*	*35*	*3.5*	*38*	*0.4*	*56*	*4.3*	*48*	*5.2*	*58*	*4.6*	*45*	--	*Jul-75*
Over/Under			-0.3		-0.1		-0.7		0.0		0.9		0.3		--	
eA All US Fixed Inc Net Median			*1.8*		*2.6*		*0.5*		*4.1*		*5.9*		*4.5*		*8.3*	*Jul-75*
Total Inflation-Linked Assets	**845,433,279**	**2.5**	**5.1**	**--**	**8.1**	**--**	**-1.3**	**--**	**-5.2**	**--**	**--**	**--**	**--**	**--**	**1.6**	**Feb-10**
ASRS Custom Inflation-Linked Benchmark			*7.0*	--	*8.1*	--	*-2.1*	--	*-6.9*	--	*1.4*	--	*2.8*	--	*0.0*	*Feb-10*
Over/Under			-1.9		0.0		0.8		1.7						1.6	
Total GTAA	**3,632,165,447**	**10.8**	**2.1**	**15**	**15.3**	**3**	**14.6**	**4**	**10.6**	**2**	**17.7**	**2**	**8.1**	**41**	**8.2**	**Jan-04**
ASRS Custom GTAA Benchmark			*1.8*	*19*	*13.5*	*12*	*13.6*	*11*	*9.7*	*6*	*15.4*	*12*	*6.5*	*64*	*6.6*	*Jan-04*
Over/Under			0.3		1.8		1.0		0.9		2.3		1.6		1.6	
eA Global TAA Net Median			*1.2*		*8.1*		*5.4*		*4.9*		*10.3*		*7.5*		*7.7*	*Jan-04*

[1]Performance of ASRS Total Domestic and International Equity includes the performance of the ASRS Domestic and International Equity asset classes and the Equity Risk Factor Portfolio with an inception date of 6/1/2013. NEPC began calculating Total Domestic and International Equity performance in January 2009. Monthly performance data from January 1998 - December 2008 was provided by State Street.

Note: Performance, ranks and medians are based on net of fee performance data. Rankings are from highest (1) to lowest (100) in the eVestment Alliance Universe.

Composition of Interim SAA Policy and ASRS Custom Asset Class Benchmarks can be found in the appendix.

Asset Class Performance Summary - Private Markets

	Market Value ($)	% of Portfolio	3 Mo (%)	1 Yr (%)	3 Yrs (%)	Inception (%)	IRR (%)	Since
Total Fund	**33,695,874,285**	**100**	**2.3**	**13.8**	**9.6**	**10.0**	**--**	**Jul-75**
Interim SAA Policy			*2.4*	*13.9*	*9.5*	*9.8*	--	*Jul-75*
Over/Under			-0.1	-0.1	0.1	0.2	--	
Actual Benchmark			*2.5*	*14.8*	*9.7*	--	--	*Jul-75*
Total Private Equity	**1,962,038,935**	**5.8**	**5.2**	**15.0**	**15.4**	**3.9**	**12.9**	**Oct-07**
Russell 2000 1 QTR Lagged			*8.7*	*38.8*	*15.7*	*7.5*	*17.3*	*Oct-07*
Over/Under			-3.5	-23.8	-0.3	-3.6	-4.4	
Total Opportunistic Equity[1]	**279,127,091**	**0.8**	**27.9**	**43.5**	**--**	**25.1**	**40.7**	**Apr-11**
Total Private Debt	**853,164,094**	**2.5**	**4.1**	**17.8**	**--**	**17.3**	**17.2**	**Jul-12**
S&P/LSTA Leveraged Loan Index + 250 bps 1 QTR Lagged			*2.3*	*7.8*	*--*	*9.3*	*8.4*	*Jul-12*
Over/Under			1.8	10.0		8.0	8.8	
Total Opportunistic Debt[1]	**884,564,294**	**2.6**	**1.8**	**8.4**	**8.5**	**8.7**	**12.1**	**Jan-08**
Total Real Estate	**1,874,277,985**	**5.6**	**3.8**	**13.2**	**13.2**	**3.4**	**5.6**	**Oct-05**
NCREIF ODCE 1 QTR Lagged			*2.9*	*12.9*	*12.5*	*4.8*	*4.8*	*Oct-05*
Over/Under			0.9	0.3	0.7	-1.4	0.8	
Total Farmland and Timber	**80,323,879**	**0.2**	**3.9**	**--**	**--**	**-46.6**	**1.1**	**Jul-13**
CPI ex-Food and Energy + 350 bps 1 QTR Lagged			*1.3*	*--*	*--*	*2.6*	*1.2*	*Jul-13*
Over/Under			2.6			-49.2	-0.1	

[1]Net absolute rate of return expectations range from 10-14% per annum.

Note: Performance is based on net of fee performance data.

Performance data for Total Private Equity, Total Opportunistic Equity, Total Private Debt, Total Opportunistic Debt, Total Real Estate, and Total Farmland and Timber and corresponding benchmarks is lagged by one quarter. Performance data and market values provided by Credit Suisse Fund Group.

Prior to 3Q 2012, the performance of the Total Private Debt and Total Opportunistic Debt asset classes was reported in aggregate. Effective 6/30/2012, the Fund's allocations to Private Debt and Opportunistic Debt were separated and will be reported separately going forward.

Time-weighted performance of private markets portfolios shown to reconcile Total Fund performance as it is reported on a time-weighted basis. Due to the drawdown nature of private markets portfolios in which the investment managers call capital over time, dollar-weighted performance, or internal rate of return (IRR) is a more appropriate measure of ASRS private markets portfolios.

Composition of Interim SAA Policy can be found in the appendix.

Public Market Asset Class Analysis

3 Years Ending March 31, 2014

	Anlzd Ret	Rank	Anlzd Std Dev	Rank	Tracking Error	Rank	Info Ratio	Rank	Sharpe Ratio	Rank	Beta	Rank	Anlzd Alpha
Total Fund	9.6%	22	8.9%	81	1.1%	48	0.2	57	1.1	53	1.0	26	0.3%
Interim SAA Policy	9.5%	28	9.0%	81	--	--	--	--	1.0	58	--	--	--
Total Domestic and International Equity	11.2%	--	13.9%	--	0.6%	--	-0.4	--	0.8	--	1.0	--	-0.2%
ASRS Custom Total Equity Benchmark	11.5%	--	14.0%	--	--	--	--	--	0.8	--	--	--	--
Total Domestic Equity	14.3%	42	13.4%	32	0.5%	1	-0.7	82	1.1	33	1.0	39	-0.5%
ASRS Custom Domestic Equity Benchmark	14.7%	36	13.3%	29	--	--	--	--	1.1	27	--	--	--
Total International Equity	5.2%	70	16.4%	40	0.8%	1	-0.3	86	0.3	66	1.0	48	-0.1%
ASRS Custom Int'l Equity Benchmark	5.4%	61	16.8%	52	--	--	--	--	0.3	64	--	--	--
Total Public Markets Fixed Income	4.3%	48	3.6%	66	0.5%	1	0.1	44	1.2	79	1.1	86	-0.3%
ASRS Custom Public Markets Fixed Income Benchmark	4.3%	48	3.3%	62	--	--	--	--	1.3	71	--	--	--
Total Inflation-Linked Assets	-5.2%	--	14.6%	--	2.3%	--	0.7	--	-0.4	--	1.0	--	1.5%
ASRS Custom Inflation-Linked Benchmark	-6.9%	--	15.1%	--	--	--	--	--	-0.5	--	--	--	--
Total GTAA	10.6%	2	9.6%	72	1.8%	6	0.5	2	1.1	22	1.0	76	0.7%
ASRS Custom GTAA Benchmark	9.7%	6	9.3%	63	--	--	--	--	1.0	24	--	--	--

Note: Performance is reported net of fees.

Ranks for statistics shown above are based on the respective universe against which the portfolio is ranked on the asset class performance summary that precedes this section of the analysis. Rankings are from highest (1) to lowest (100) in the eVestment Alliance Universe.

Composition of Interim SAA Policy and ASRS Custom Benchmarks can be found in the appendix.

Public Market Asset Class Analysis

5 Years Ending March 31, 2014

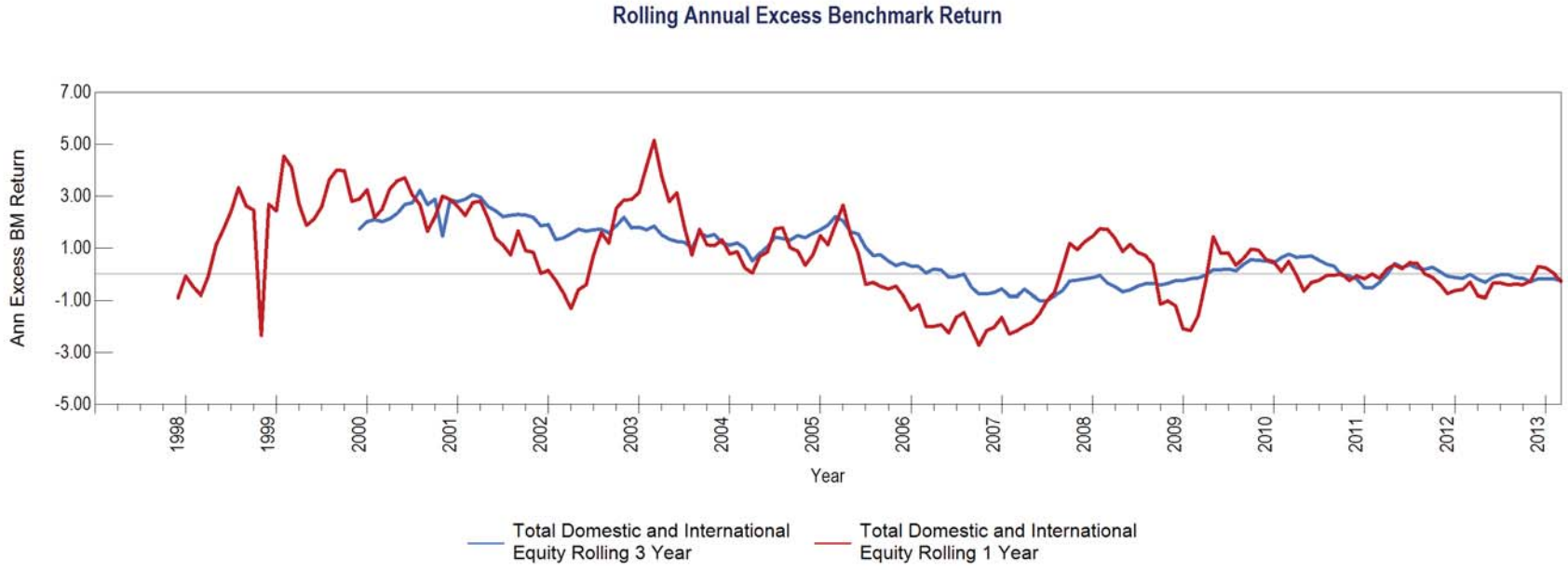
	Anlzd Ret	Rank	Anlzd Std Dev	Rank	Tracking Error	Rank	Info Ratio	Rank	Sharpe Ratio	Rank	Beta	Rank	Anlzd Alpha
Total Fund	15.9%	12	10.1%	83	1.1%	20	0.3	60	1.6	66	1.0	40	0.6%
Interim SAA Policy	15.7%	17	10.3%	84	--	--	--	--	1.5	77	--	--	--
Total Domestic and International Equity	20.0%	--	15.3%	--	0.9%	--	-0.4	--	1.3	--	1.0	--	0.1%
ASRS Custom Total Equity Benchmark	20.3%	--	15.6%	--	--	--	--	--	1.3	--	--	--	--
Total Domestic Equity	22.5%	49	14.9%	33	0.5%	1	0.2	36	1.5	27	1.0	42	0.0%
ASRS Custom Domestic Equity Benchmark	22.4%	50	14.8%	31	--	--	--	--	1.5	26	--	--	--
Total International Equity	15.2%	75	17.9%	39	1.5%	1	-0.9	99	0.8	71	1.0	48	-0.6%
ASRS Custom Int'l Equity Benchmark	16.5%	56	18.7%	57	--	--	--	--	0.9	60	--	--	--
Total Public Markets Fixed Income	6.1%	49	3.4%	57	0.9%	1	1.1	31	1.8	65	1.0	87	0.8%
ASRS Custom Public Markets Fixed Income Benchmark	5.2%	58	3.1%	52	--	--	--	--	1.6	74	--	--	--
Total Inflation-Linked Assets	--	--	--	--	--	--	--	--	--	--	--	--	--
ASRS Custom Inflation-Linked Benchmark	1.4%	--	12.8%	--	--	--	--	--	0.1	--	--	--	--
Total GTAA	17.7%	2	10.7%	79	2.0%	9	1.2	1	1.6	9	1.0	80	2.2%
ASRS Custom GTAA Benchmark	15.4%	12	10.5%	76	--	--	--	--	1.5	42	--	--	--

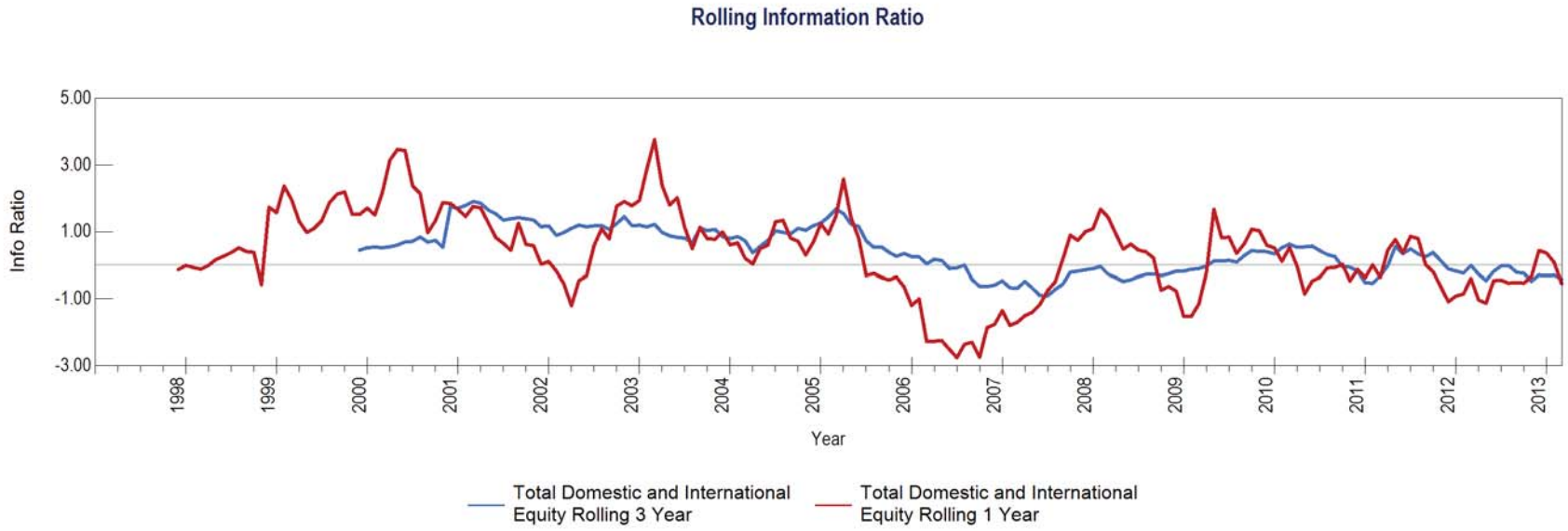
Note: Performance is reported net of fees.

Ranks for statistics shown above are based on the respective universe against which the portfolio is ranked on the asset class performance summary that precedes this section of the analysis. Rankings are from highest (1) to lowest (100) in the eVestment Alliance Universe.

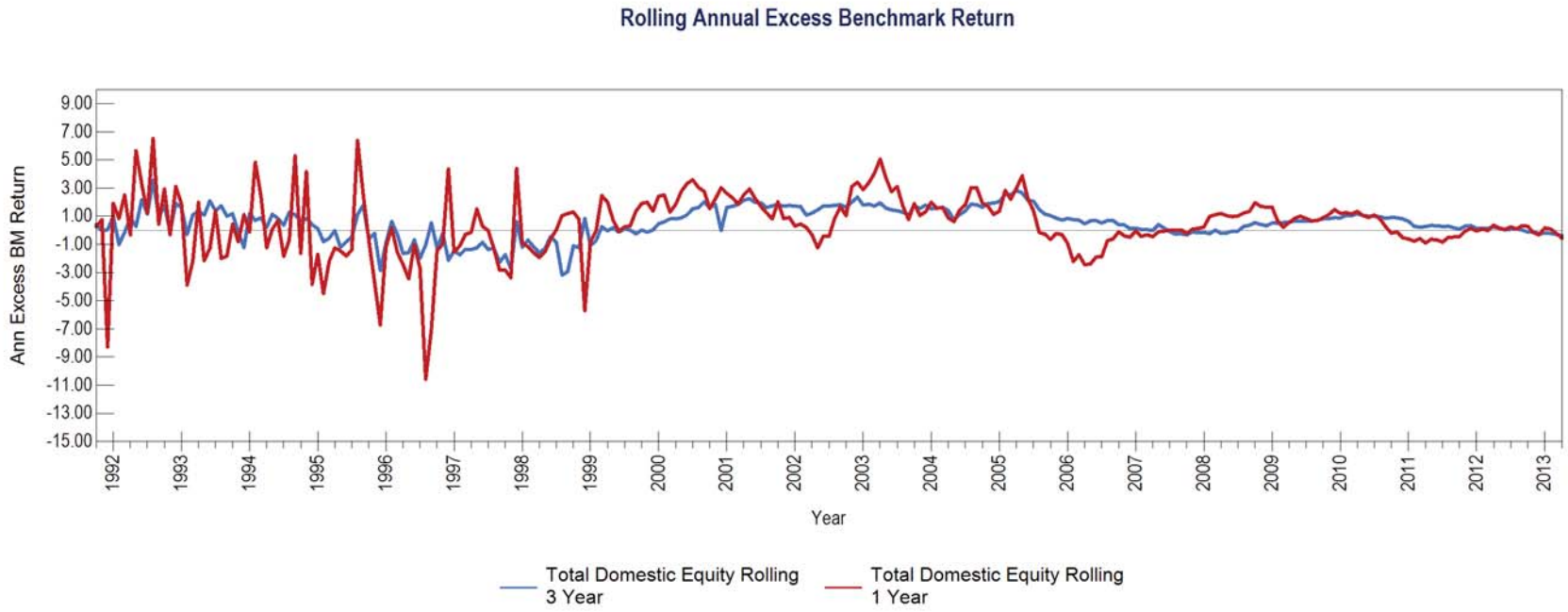
Composition of Interim SAA Policy and ASRS Custom Benchmarks can be found in the appendix.

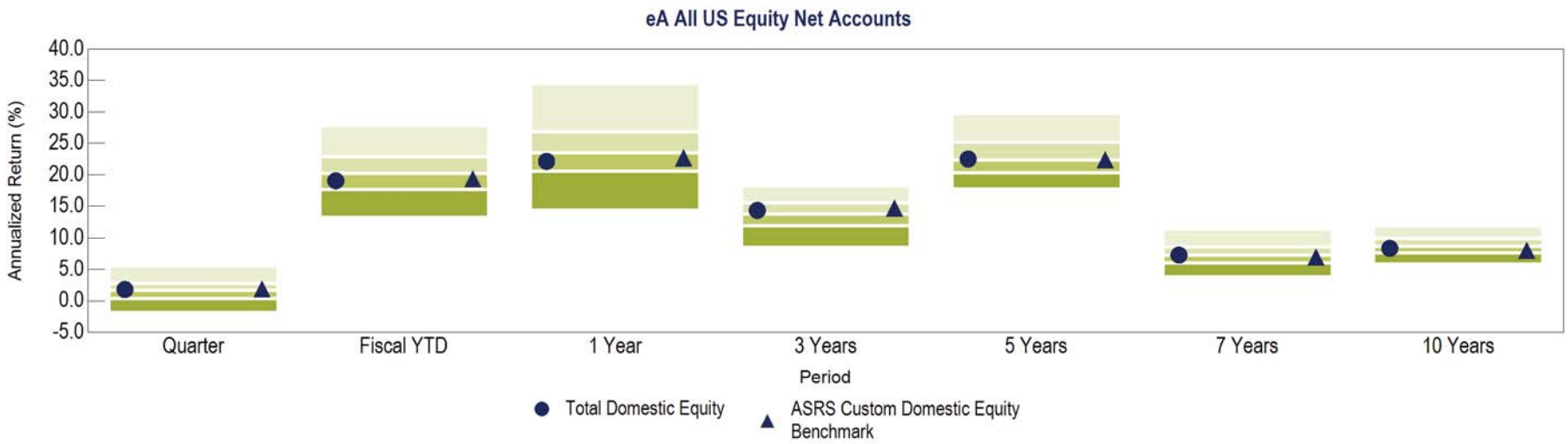
Asset Class Analysis - Total Domestic and International Equity



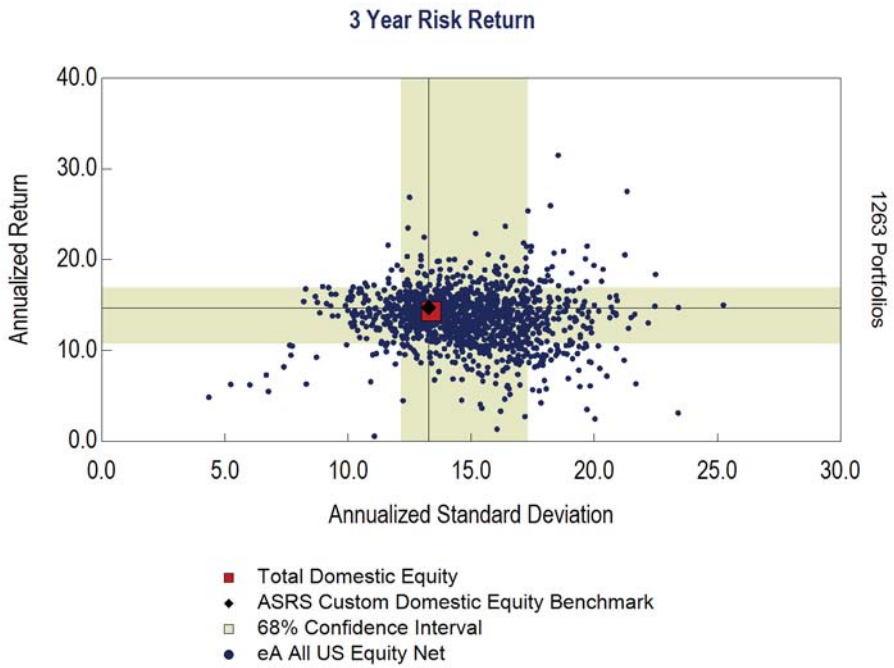


Asset Class Analysis - Total Domestic Equity

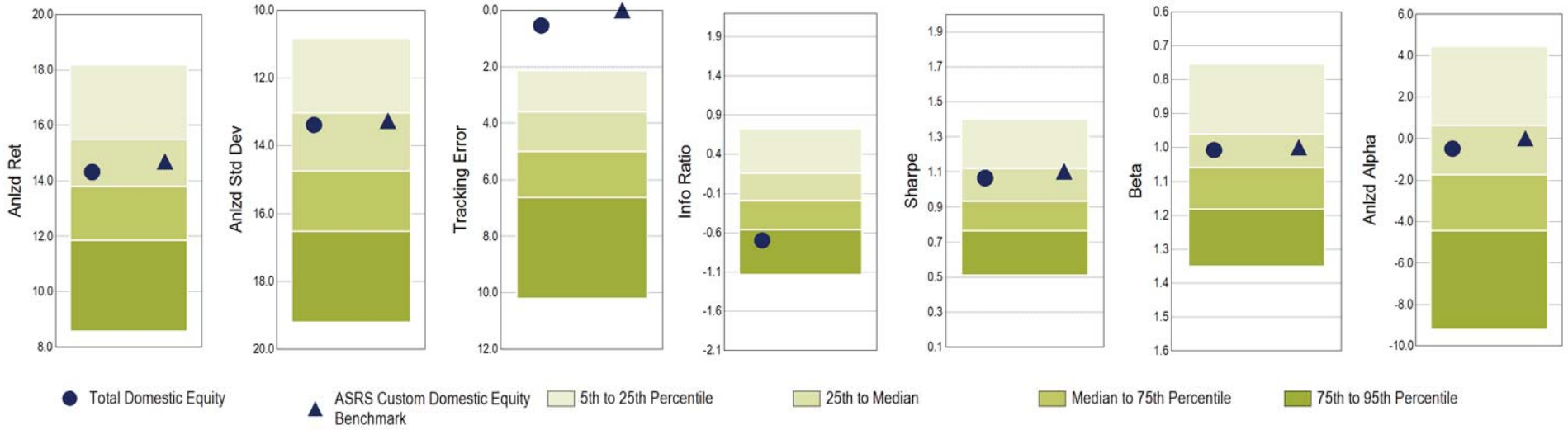




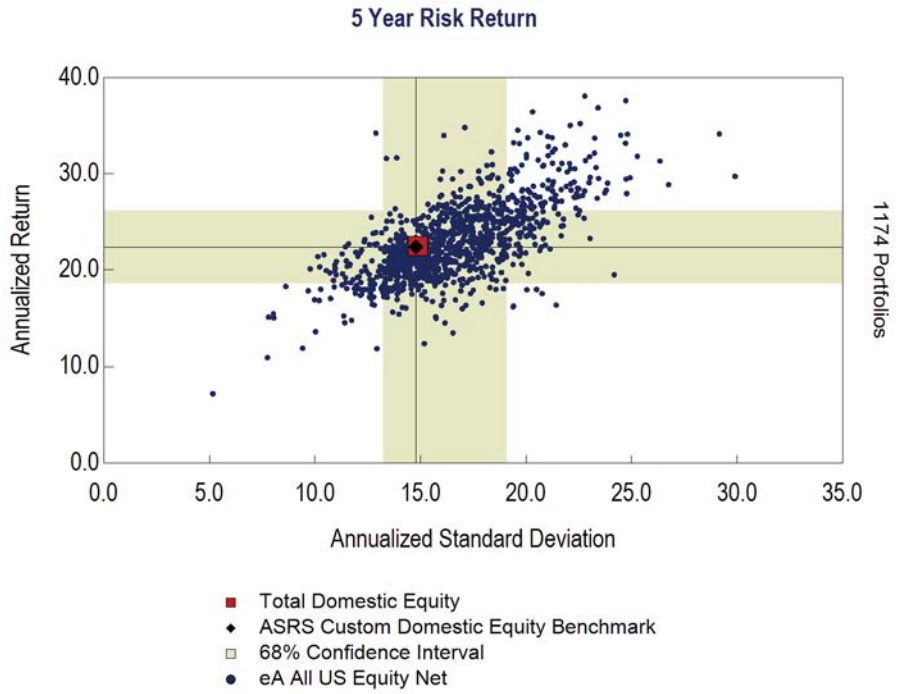
Asset Class Analysis - Total Domestic Equity

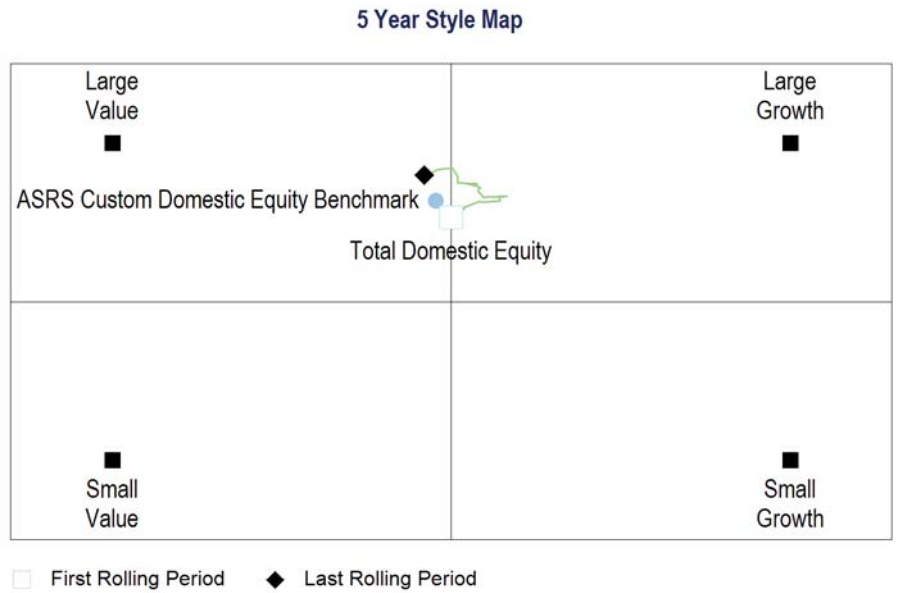


*Style map is returns based.

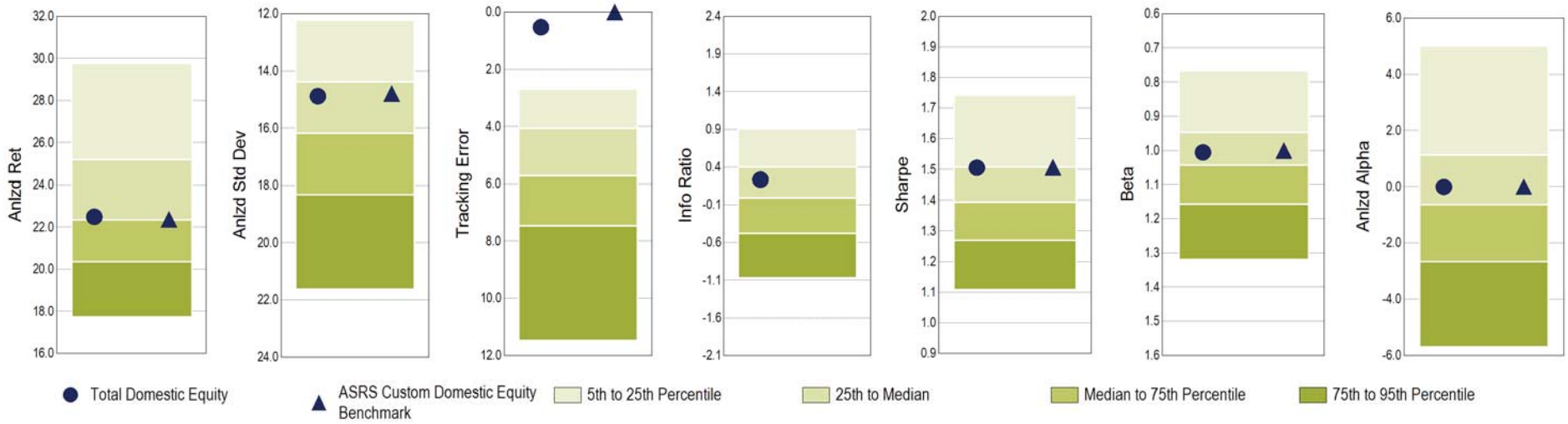


Asset Class Analysis - Total Domestic Equity

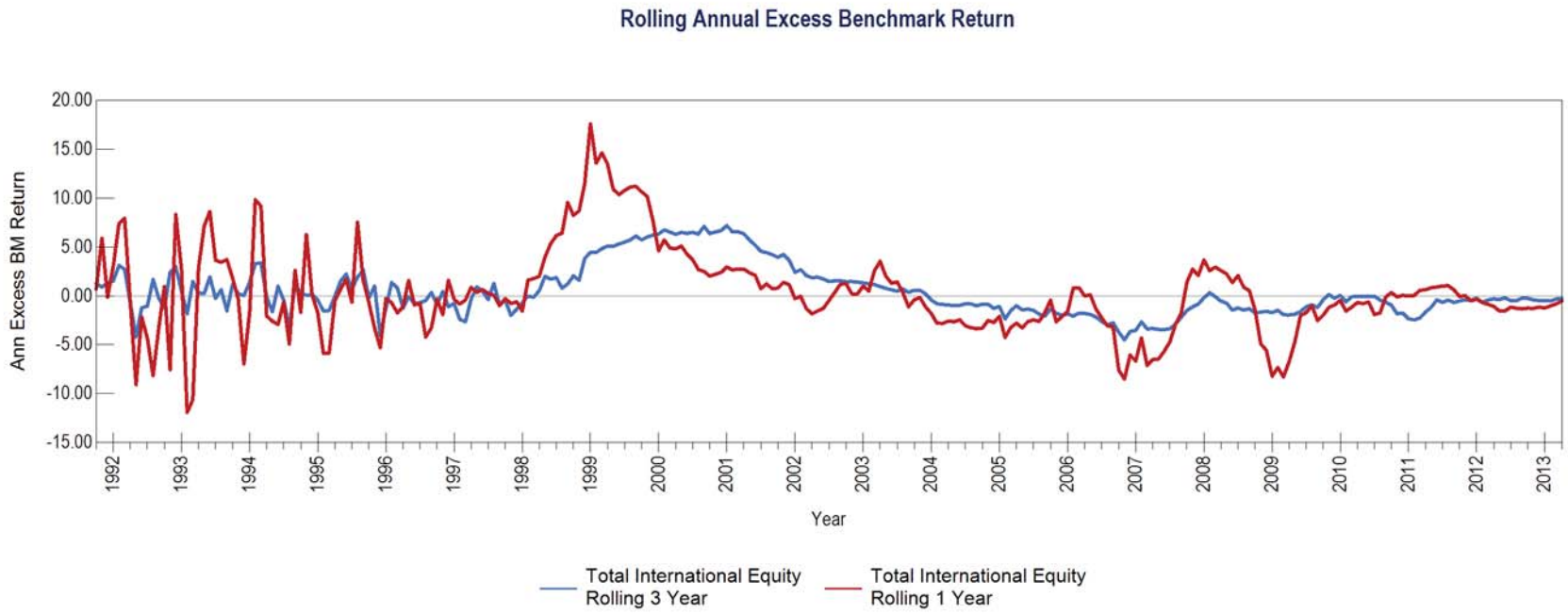


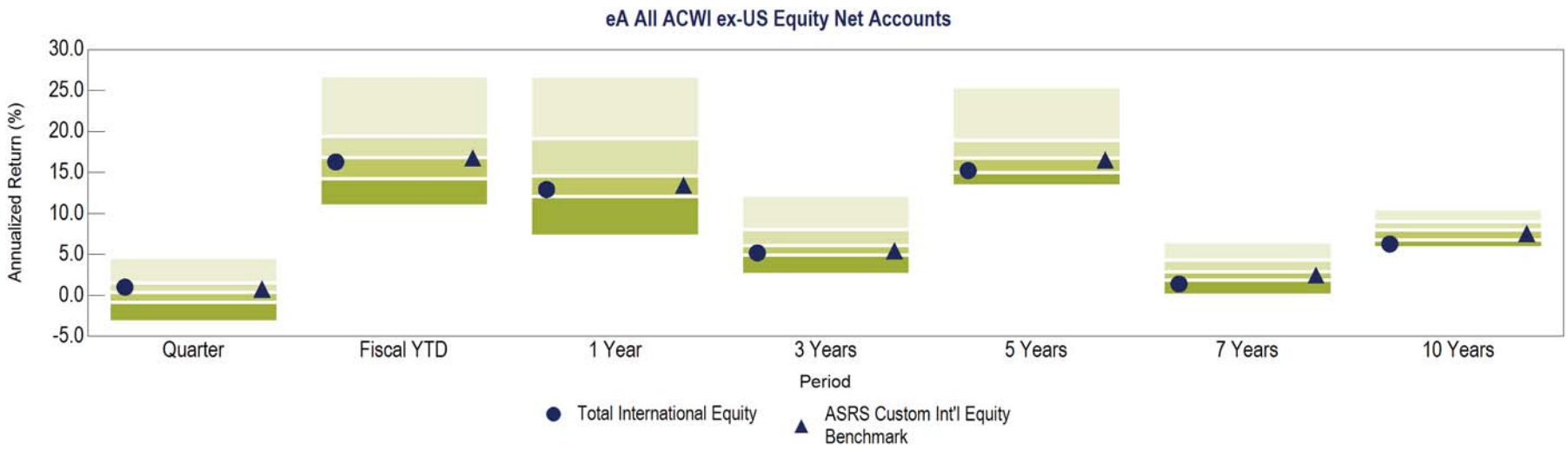


*Style map is returns based.

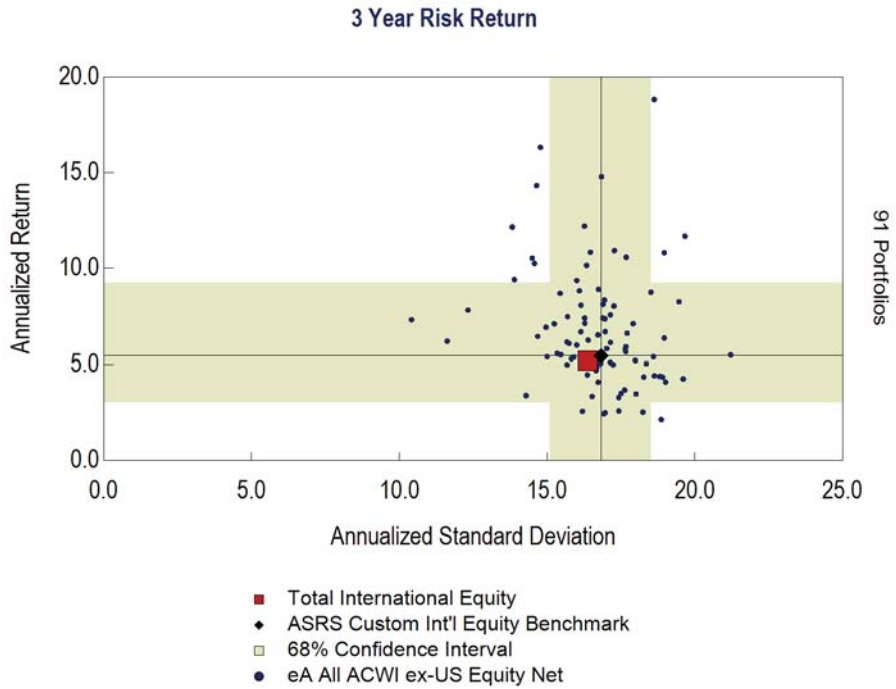


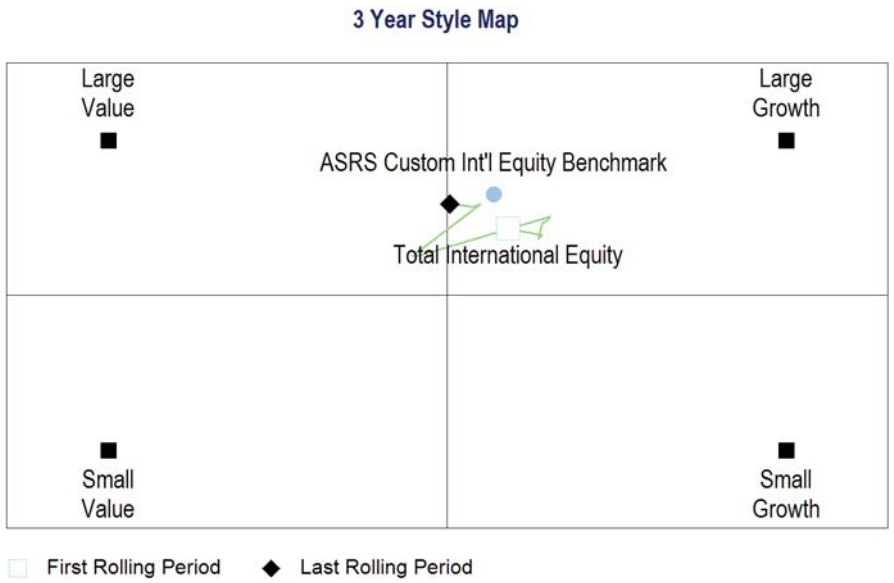
Asset Class Analysis - Total International Equity



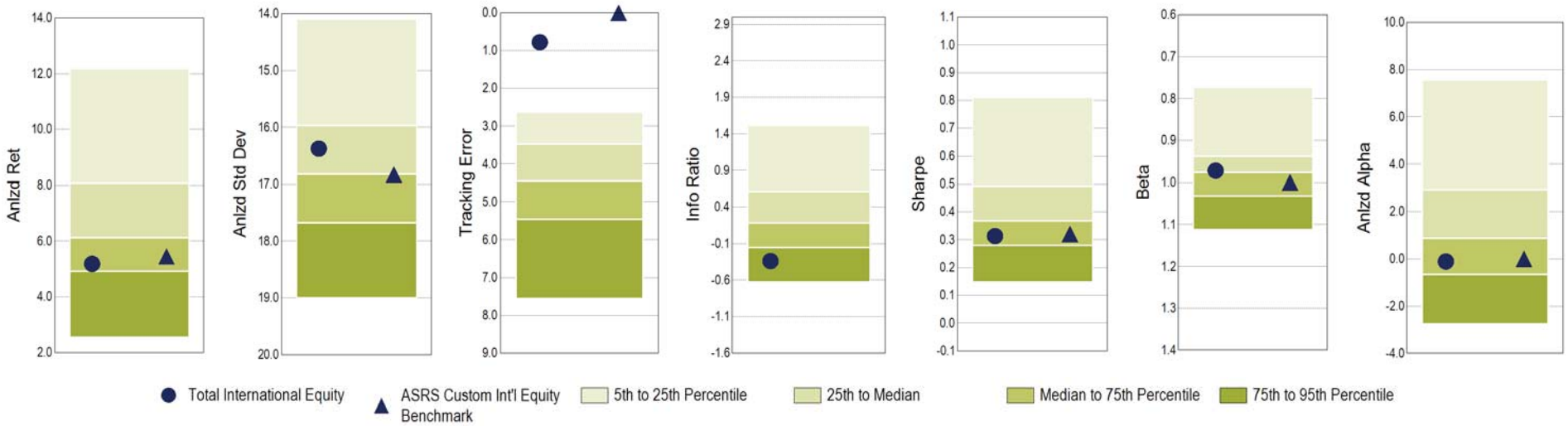


Asset Class Analysis - Total International Equity

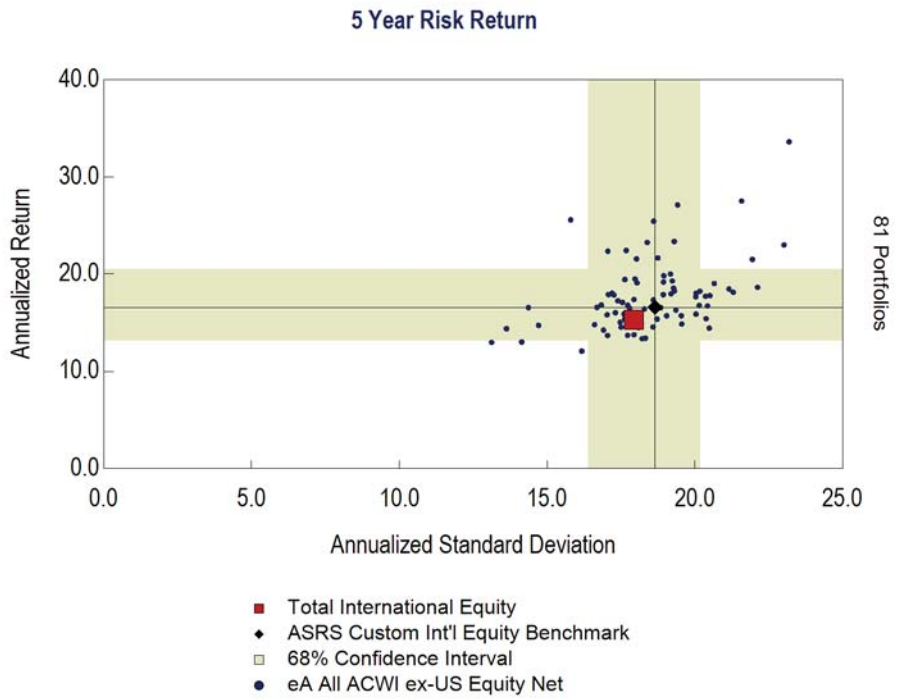


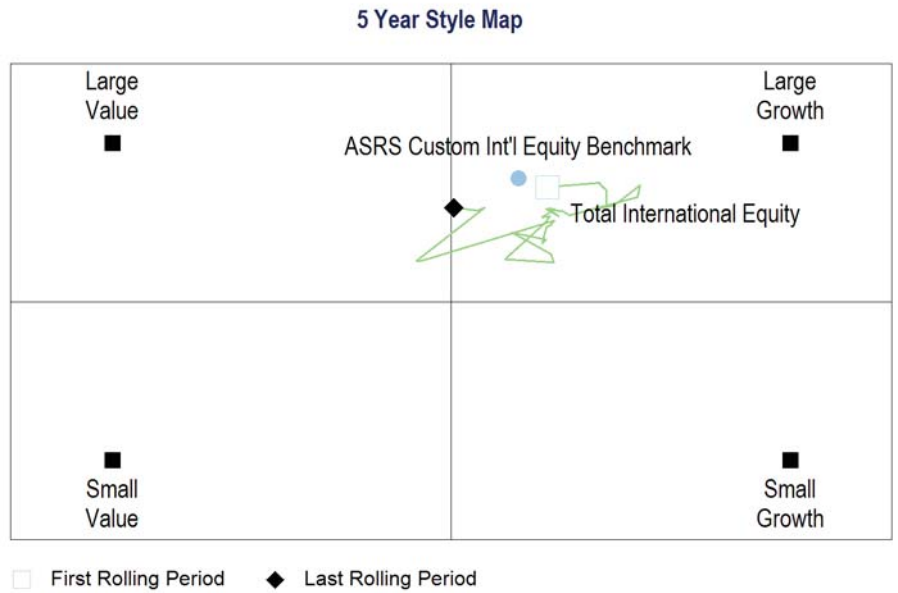


*Style map is returns based.

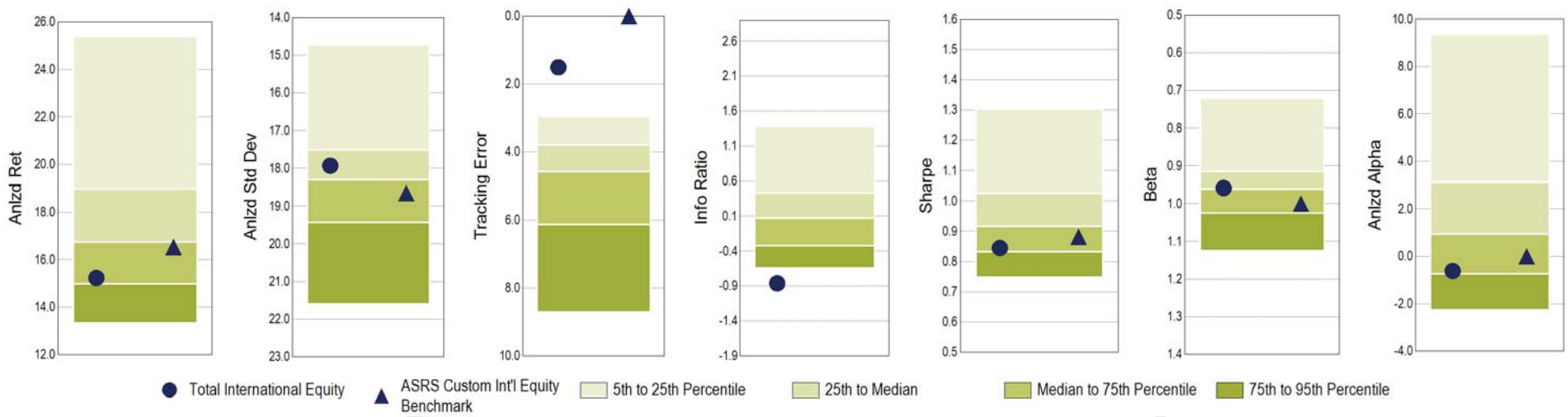


Asset Class Analysis - Total International Equity

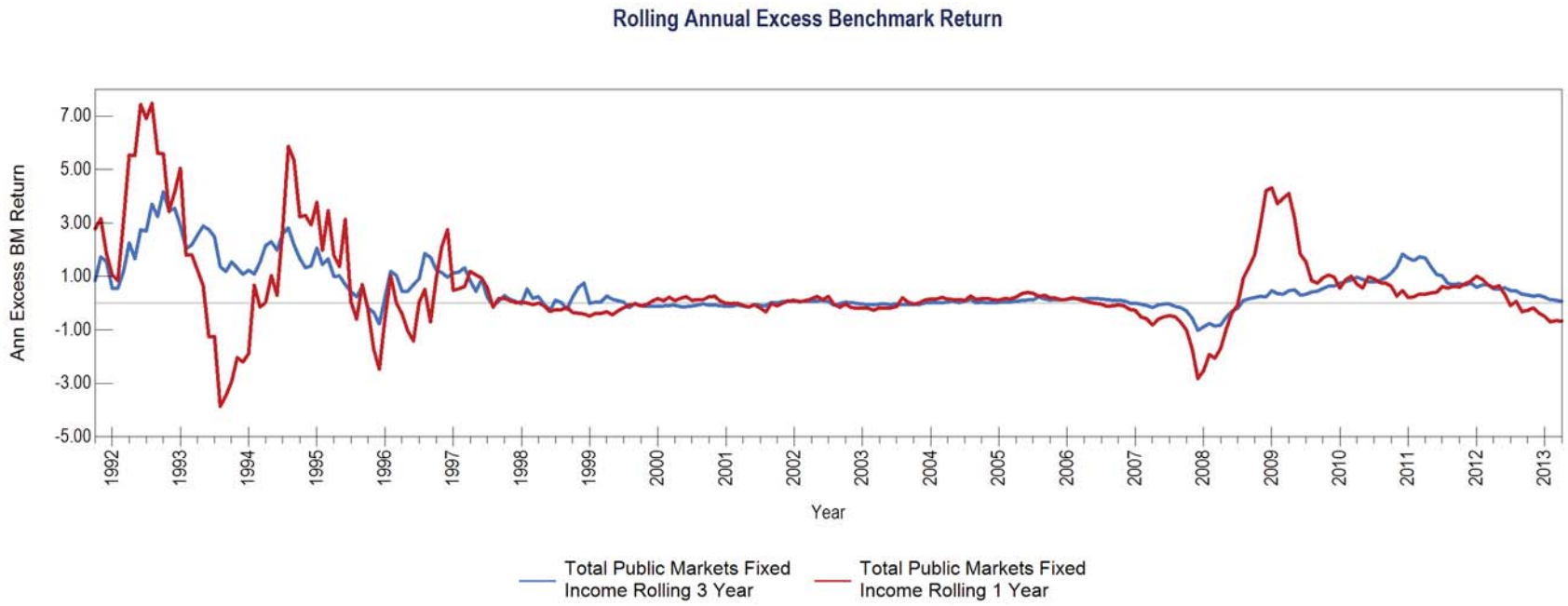




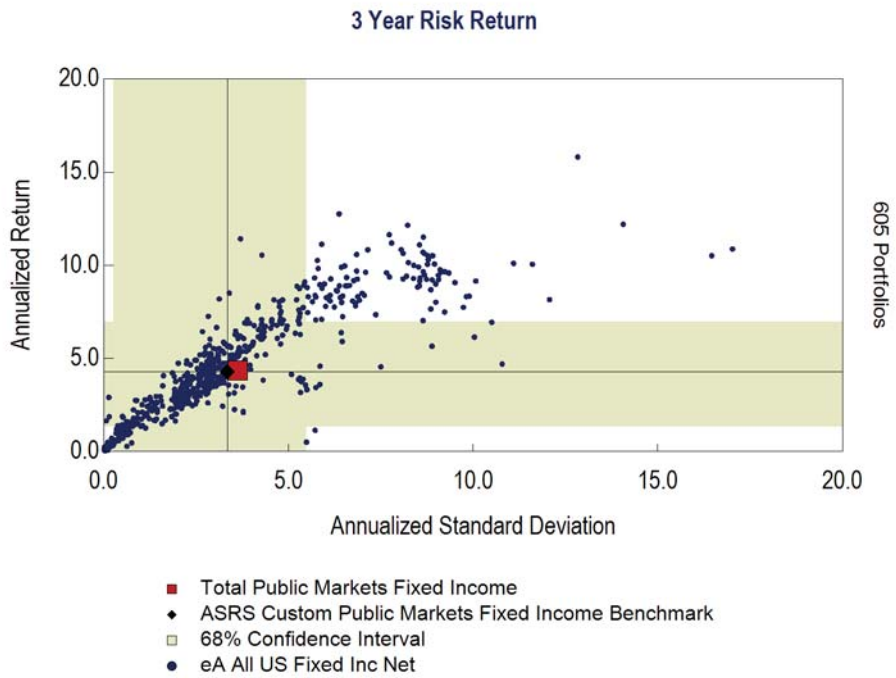
*Style map is returns based.

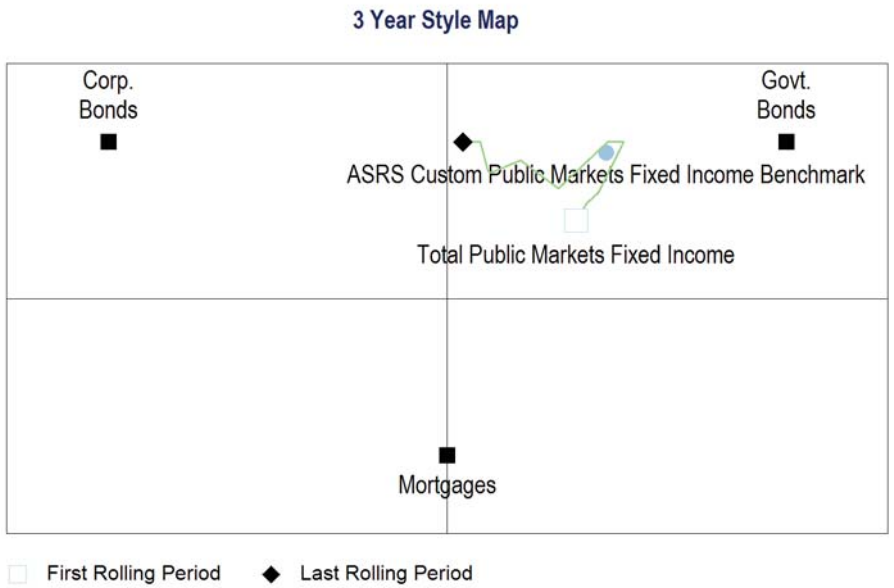


Asset Class Analysis - Total Public Markets Fixed Income

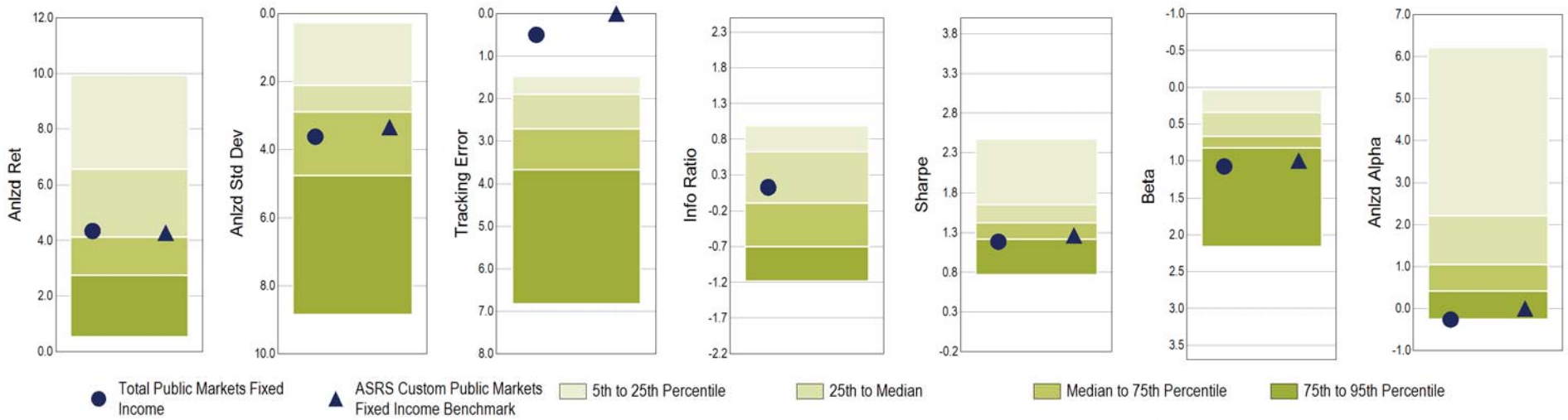


Asset Class Analysis - Total Public Markets Fixed Income

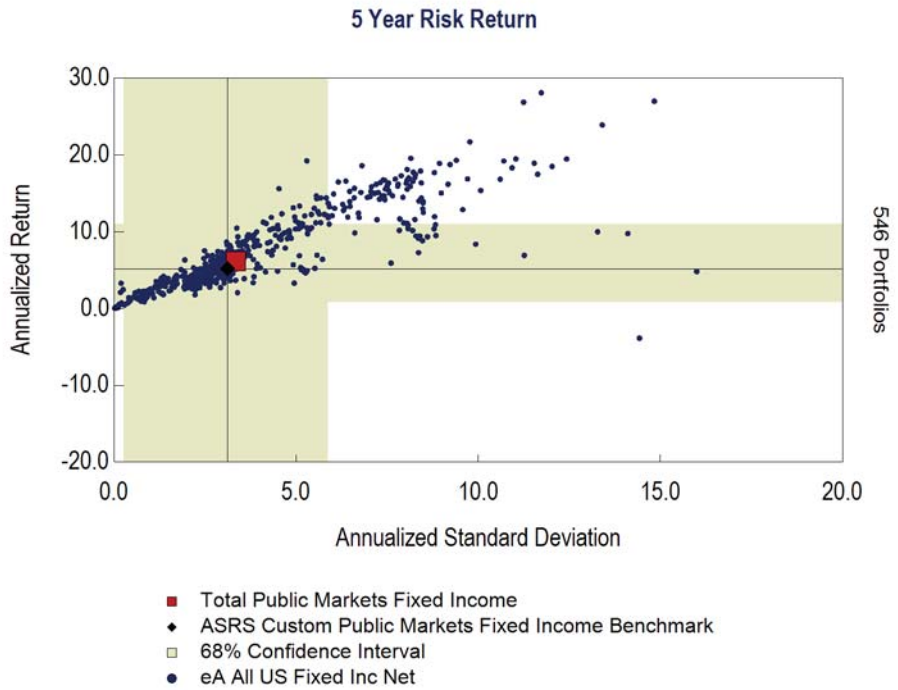


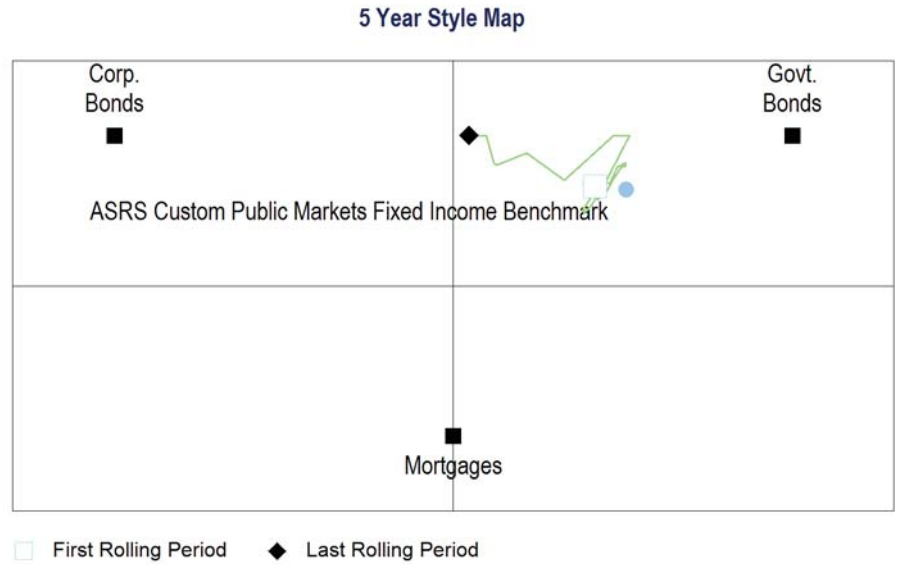


*Style map is returns based.

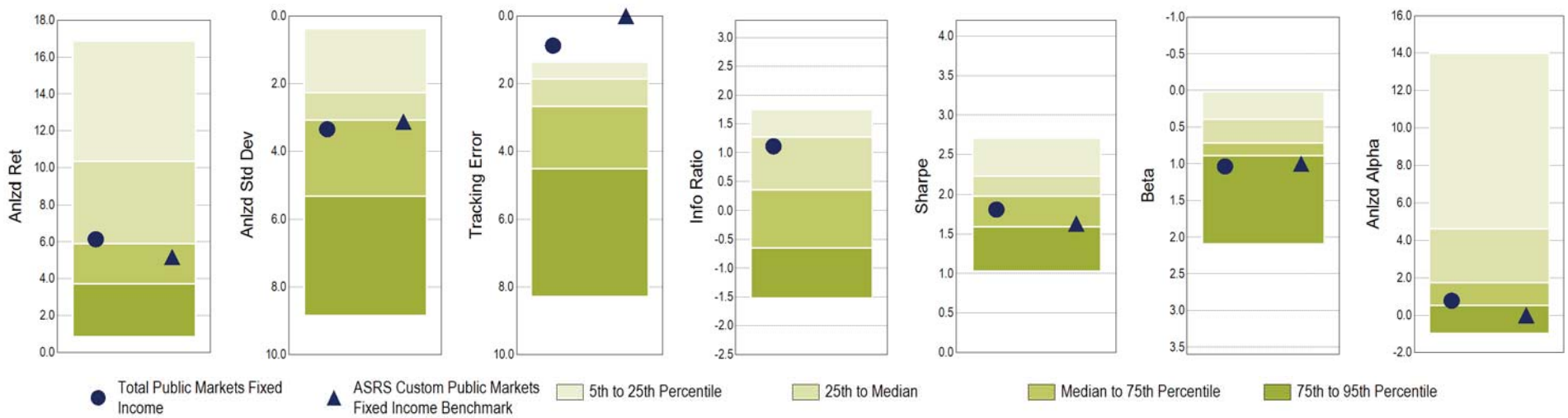


Asset Class Analysis - Total Public Markets Fixed Income

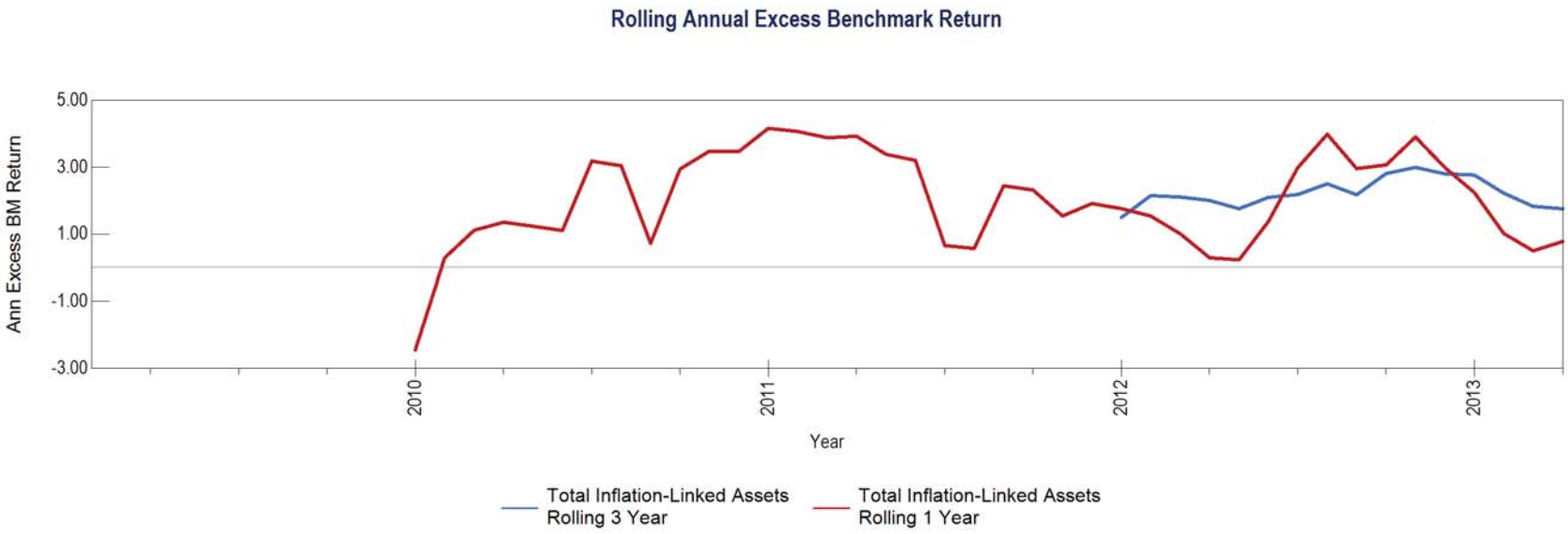


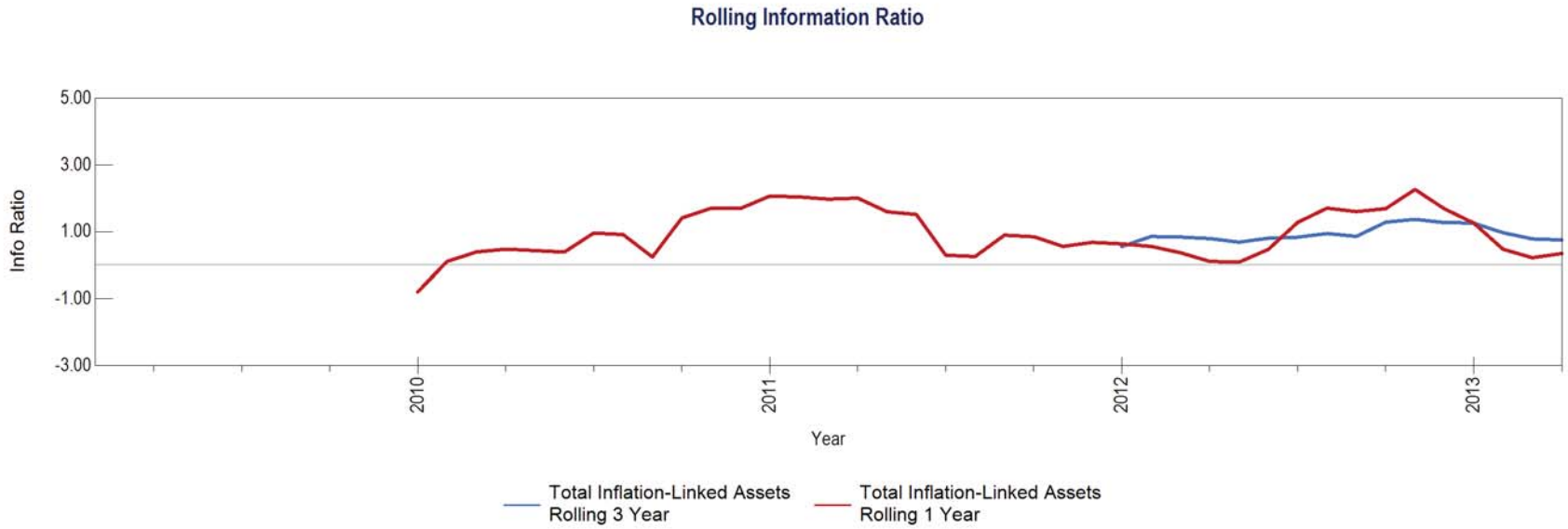


*Style map is returns based.

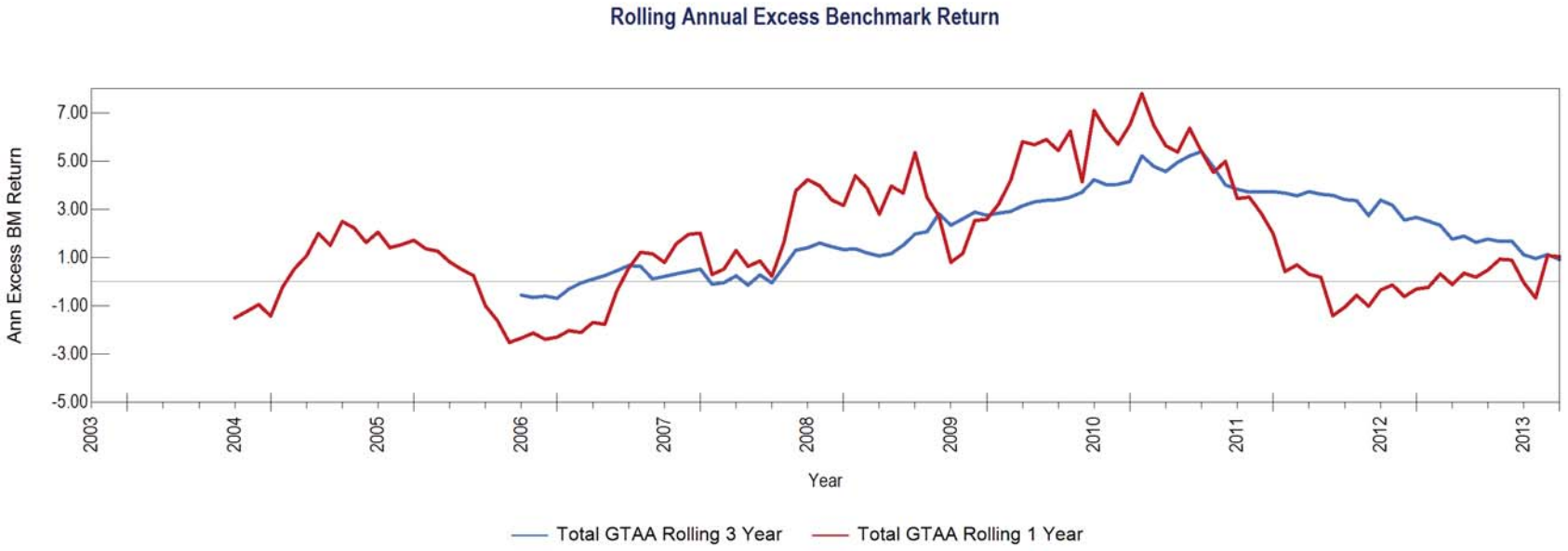


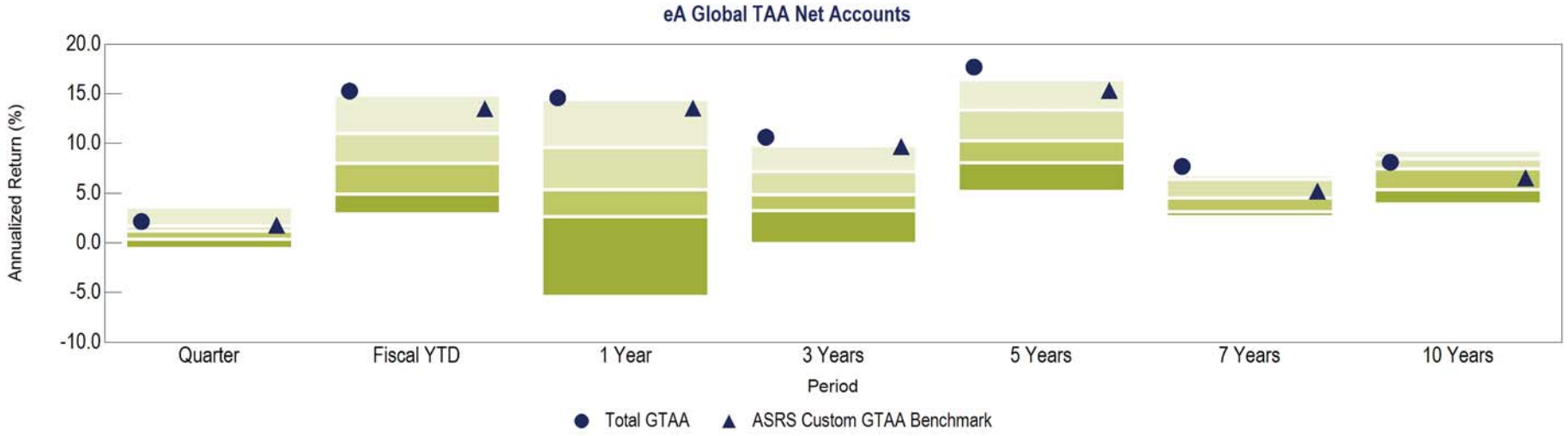
Asset Class Analysis - Total Inflation-Linked Assets



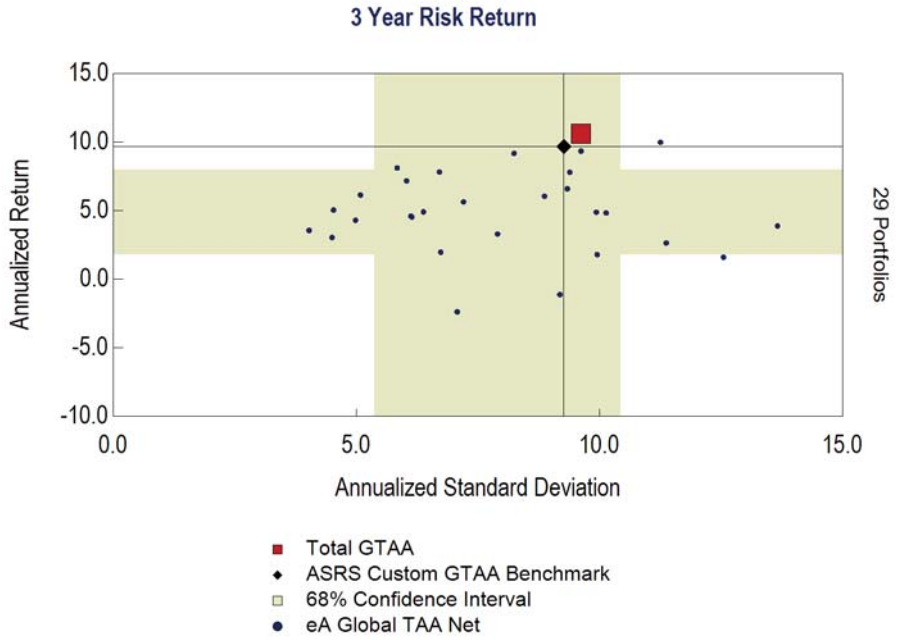


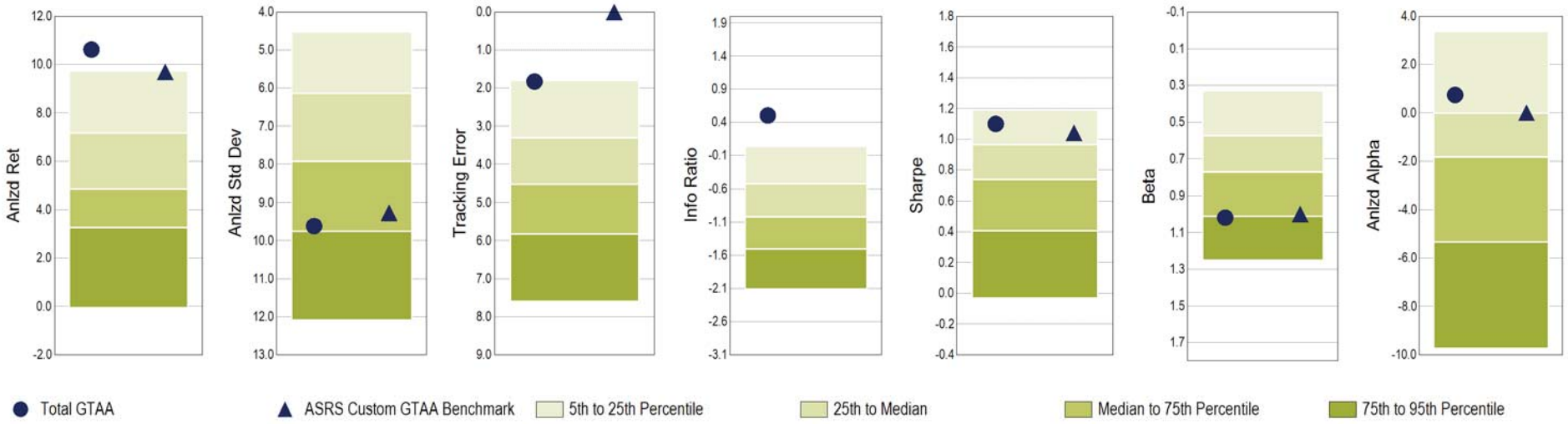
Asset Class Analysis - Total GTAA



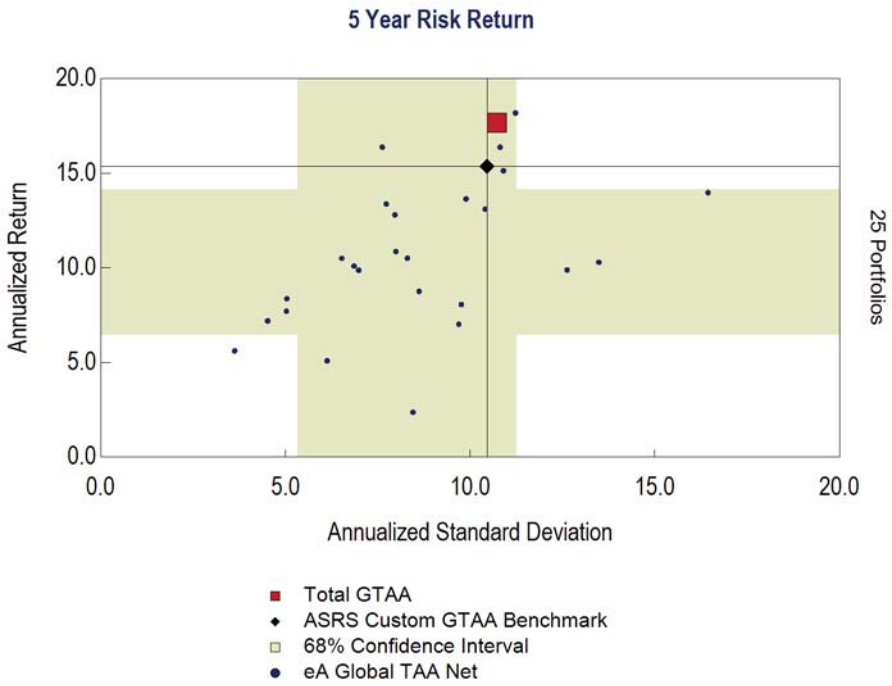


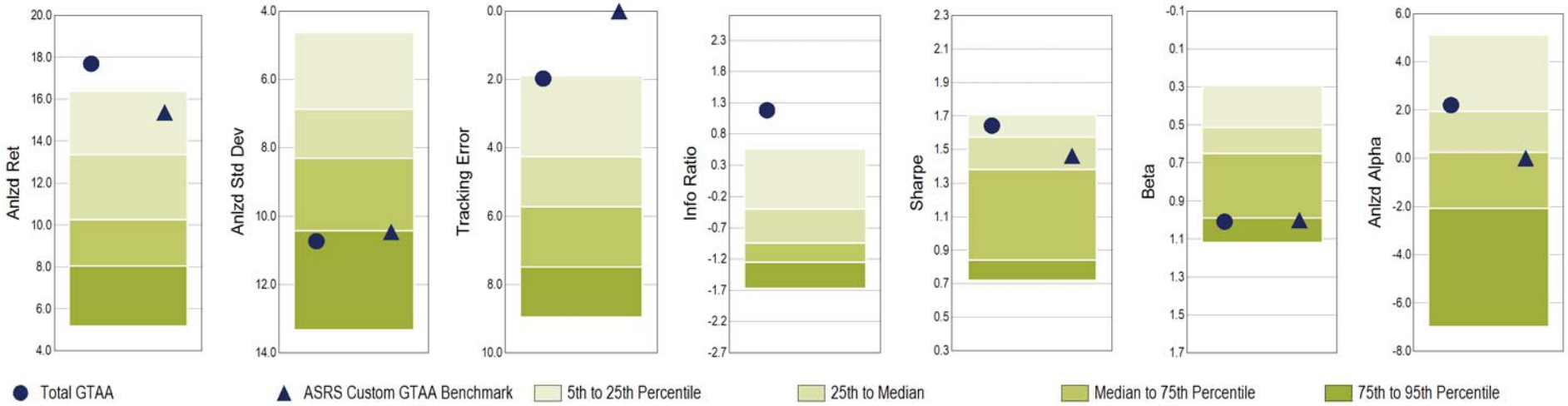
Asset Class Analysis - Total GTAA





Asset Class Analysis - Total GTAA





Asset Class Committee Monitoring

- **Eight Asset Class Committee meetings have been held since the last time we provided an update on the ASRS Asset Class Committee Meetings.**

- **February 21, 2014 – Private Markets Committee**
  - Review of Private Markets Program Staff Report
  - General Discussion on Future Agenda Items and Deal Flow
  - Private Equity Manager Recommendation ($75 million)
    - Consistent with strategic plan at the Total Fund level (SAAP Target to Private Equity is 7%)
    - The ASRS has invested with this manager in a prior fund and has also approved co-investment with this manager and is in the process of finalizing the legal documents to begin co-investing.
    - Due diligence process was followed in accordance with SIP006 – Investment Manager, Partner, and Co-Investment Selection and Oversight.
    - Committee approved the recommendation.
  - Private Equity Manager Recommendation ($50 million)
    - Consistent with strategic plan at the Total Fund level (SAAP Target to Private Equity is 7%)
    - The ASRS has invested with this manager in a prior fund.
    - Due diligence process was followed in accordance with SIP 006 – Investment Manager, Partner, and Co-Investment Selection and Oversight.
    - Committee approved the recommendation.

Asset Class Committee Monitoring

- **February 21, 2014 – Private Markets Committee (continued)**
  - Niche and Tactical Real Estate Discussion
    - The Committee previously approved a $350 million program of niche and tactical real estate investments and authorized RCLCO, the Plan's real estate advisor, to develop a detailed plan for implementation and a preliminary pipeline.
    - The Committee authorized the ASRS private markets team and RCLCO to proceed with implementation of the niche and tactical real estate program over what is estimated to be a two year period.
      - There is no requirement to invest the entire $350 million.
      - Investments will be approved in a two-step process by the PRIVMC, first as a preliminary presentation and second, if further work is authorized, as a final, more detailed presentation.
      - Several specific investment criteria were established, subject to modifications, including expected return targets, minimum size of investments, location of investments (all U.S.), use of leverage (65% max), the structure of the investments and additional partners.
      - A financial reporting and monitoring process will be established.
    - Consistent with strategic plan at the Total Fund level (SAAP Target to Real Estate is 8%)
  - Residential Land Discussion
    - The 2014 real estate pacing and implementation plan included a recommendation from RCLCO for the ASRS to consider investments in residential land as an opportunistic equity investment.
      - The recommendation was not approved, but the Committee authorized RCLCO to perform additional work on the topic to provide a more detailed explanation of the market opportunity.
    - The Committee authorized the ASRS private markets team and RCLCO to proceed with implementation of the residential land strategy to invest $100 million.
      - There is no requirement to invest the entire $100 million. Program is designed to return all capital within three years.
      - Investments will be approved in a two-step process by the PRIVMC, first as a preliminary presentation and second, if further work is authorized, as a final, more detailed presentation.
      - Several specific investment criteria were established, subject to modifications, including expected return targets, minimum size of investments, location of investments (all U.S.) and geographic diversification, use of leverage (50% max for any one property; 30% max at the portfolio level), the structure of the investments and additional partners.
      - A financial reporting and monitoring process will be established.
    - Consistent with strategic plan at the Total Fund level (SAAP Target to Opportunistic Equity is 0% with a range of 0-3%)

Asset Class Committee Monitoring

- **March 24, 2014 – Private Markets Committee**
  - Review of Private Markets Program Staff Report
  - General Discussion on Future Agenda Items and Deal Flow
  - Private Equity Manager Recommendation ($75 million)
    - Consistent with strategic plan at the Total Fund level (SAAP Target to Private Equity is 7%)
    - Due diligence process was followed in accordance with SIP006 – Investment Manager, Partner, and Co-Investment Selection and Oversight.
    - Committee approved the recommendation.
  - Private Equity Manager Recommendation ($50 million)
    - Consistent with strategic plan at the Total Fund level (SAAP Target to Private Equity is 7%)
    - Due diligence process was followed in accordance with SIP006 – Investment Manager, Partner, and Co-Investment Selection and Oversight.
    - Committee approved the recommendation.

- **March 27, 2014 – Public Markets Committee**
  - Review of Public Equity Program Staff Report
  - Non-U.S. Developed Markets Large Cap Equity Re-Structure and Manager Recommendation ($1.0 billion)
    - Staff recommended the termination of three non-U.S. developed markets large cap equity managers and to transition those assets to three new managers, with a residual amount ($5 million) allocated to the remaining active manager (Brandes).
      - New managers are growth ($525 million), concentrated core ($350 million) and value ($155 million) strategies to complement the existing value portfolio managed by Brandes ($523 million).
    - Consistent with strategic plan at the Total Fund level (SAAP Target to Int'l Dev. Mkts Large Cap is 14%)
    - Due diligence process was followed in accordance with SIP 006 – Investment Manager, Partner, and Co-Investment Selection and Oversight.
    - Committee approved the recommendation.

Asset Class Committee Monitoring

- **April 17, 2014 – Public Markets Committee**
  - Committee approved termination of active core fixed income mandate managed by PIMCO.
    - Portfolio Manager responsible for ASRS portfolio left PIMCO during the first quarter.
    - BlackRock US Debt mandate reengaged to manage the assets going forward.
  - Committee approved termination of active high yield fixed income mandate managed by Shenkman.
    - This results in a 1.5% underweight to high yield fixed income vs. SAAP.
    - IMD currently favors opportunistic and private debt mandates over high yield fixed income.
  - Emerging Markets Discussion
    - With regard to emerging market debt, IMD expressed concerns with volatility levels in the asset class, noting that currency volatility has significantly detracted from performance and is larger than anticipated.
    - Currency volatility is a concern regardless of whether it has a positive or negative impact.
    - IMD is currently underweight emerging market debt vs. SAAP (2.7% vs. 4% SAAP target)
    - Within equities, each of the ASRS active emerging market equity managers are outperforming the benchmark since inception and volatility has stabilized; however, significant outflows from emerging market equities has negatively impacted performance.

- **April 22, 2014 – Private Markets Committee**
  - Review of Private Markets Program Staff Report
  - General Discussion on Future Agenda Items and Deal Flow
    - Update on the status of back office provider search.
    - Discussion of 'covenant light' lending and impact on ASRS private debt allocation.
    - Private Equity benchmarking was discussed but no action was taken.
    - Update on residential land strategy search.
  - Private Equity Manager Recommendation ($40 million)
    - Consistent with strategic plan at the Total Fund level (SAAP Target to Private Equity is 7%).
    - Due diligence process was followed in accordance with SIP006 – Investment Manager, Partner, and Co-Investment Selection and Oversight.
    - Committee approved the recommendation.

Asset Class Committee Monitoring

- **May 12, 2014 – Ad Hoc Private Markets Committee**
  - Opportunistic Equity Manager Recommendation($100 million)
    - Separately managed portfolio to invest in residential land pursuant to 2/21/2014 PRIVMC meeting discussion. There is no requirement that the entire $100 million be invested.
    - Consistent with strategic plan at the Total Fund level (SAAP Target to Opportunistic Equity is 0% with a range of 0-3%; Aggregate Opportunistic asset classes not to exceed 10%).
    - Due diligence process was followed in accordance with SIP006 – Investment Manager, Partner, and Co-Investment Selection and Oversight.
    - Committee approved the recommendation.

- **May 27, 2014 – Private Markets Committee**
  - Review of Private Markets Program Staff Report
  - General Discussion on Future Agenda Items and Deal Flow
    - $600 million in commitments targeted for 2014.
  - Private Equity Manager Recommendation ($40 million)
    - Consistent with strategic plan at the Total Fund level (SAAP Target to Private Equity is 7%).
    - Due diligence process was followed in accordance with SIP006 – Investment Manager, Partner, and Co-Investment Selection and Oversight.
    - Committee approved the recommendation.
  - Private Equity Manager Recommendation ($25 million)
    - Consistent with strategic plan at the Total Fund level (SAAP Target to Private Equity is 7%).
    - Due diligence process was followed in accordance with SIP006 – Investment Manager, Partner, and Co-Investment Selection and Oversight.
    - Committee approved the recommendation.

Asset Class Committee Monitoring

- **May 28, 2014 – Private Markets Committee**
  - Niche and Tactical Real Estate Discussion
    - At the 2/21/2014 PRIVMC meeting, the Committee approved the pursuit of niche and tactical investments in the real estate asset class in accordance with a documented procedure that includes approval by the Committee before conducting a full due diligence review.
    - IMD presented five potential investments and the Committee authorized further due diligence on each.

General Observations

- **The Fund continues to make significant progress moving the portfolio from the Interim SAAP toward the long-term SAAP.**
  - Full implementation results in a further reduction of 2% within U.S. Equities and 2% within U.S. Core Fixed Income and an increase of 1% to Private Equity, 1% to Private Debt, and 2% to Real Estate.

- **Strong absolute and relative Total Fund performance driven largely by the Fund's exposure to global equities.**
  - The Fund's volatility ranks in the bottom quartile of its peer group over all time periods reported herein due to its overweight to equities relative to peers. However, risk-adjusted measures of performance show the Fund is generating more return per unit of risk taken than approximately half of its peers over all time periods reported and more than one third of its peers over the three-year period.
  - Continued build-out of private debt and opportunistic debt asset classes provides an opportunity to generate equity-like returns with less volatility.

- **Restructuring of non-U.S. developed markets large cap equity allocation eliminates three underperforming actively managed strategies and replaces them with three new actively managed strategies.**
  - Goal of smoothing the volatility and return profile of the Fund's allocation to non-U.S. developed markets equities as the existing managers had experienced unusually large tracking error and poor relative performance over the short to intermediate term, which negated all of the value add that had been added relative to respective benchmarks since their inception.

- **Emerging markets, both equities and debt, have significantly trailed developed markets over the past year.**
  - We continue to advise clients to gain exposure to emerging markets through both debt and equity based on our belief in the long-term growth prospects of emerging markets countries relative to developed markets.
  - Critical to recognize that higher return expectations come with higher levels of volatility.
  - Individual emerging market countries are likely to behave in a more idiosyncratic fashion going forward.
  - A top-down active manager could potentially alleviate some of the macro challenges.
  - Current valuations present a compelling entry point or potential opportunity to add to allocations.

General Observations

- **$355 million in commitments to Private Equity strategies in line with strategic plan and pacing model for the asset class.**

- **$100 million commitment to Opportunistic Equity strategy increases total commitments to Opportunistic asset classes to $1.8 billion, or approximately 5.5% of the Total Fund. Aggregate Opportunistic asset classes not to exceed 10% per the SAAP.**
  - Total $435 million in commitments to Opportunistic Equity strategies = 1.3% of the Total Fund (SAAP Target to Opportunistic Equity is 0% with a range of 0-3%).
  - Total $1.4 billion in commitments to Opportunistic Debt strategies = 4.2% of the Total Fund (SAAP Target to Opportunistic Debt is 0% with a range of 0-10%).
  - Current actual exposure to Opportunistic investments is 3.4% of the Total Fund, which is largely comprised of investments in Opportunistic Debt strategies.

- **Tactical positioning consistent with IMD House Views**

Market Environment Update and Outlook

Economic Environment

- **First quarter GDP growth was slower at 0.1% principally due to severe winter weather. Potential for second quarter rebound in growth?**
  - Retail sales (ended March) rose to 2.2% on a year-over-year growth rate basis.
  - The inventory-to-sales ratio has remained mostly flat since early 2010 and closed at 1.31% in February.
  - Corporate profits as a percent of GDP remained near secular highs at 12.7% at the end of Q4 2013.
  - The trade deficit increased in February.

- **The unemployment rate stayed flat at 6.7% in March; U-6, a broader measure of unemployment, rose to 12.7% during the first quarter.**
  - JP Morgan has stated that sustained GDP growth of 1.5% is needed for positive job creation, and closer to 3% growth is needed to decrease the unemployment rate.

- **Consumer confidence fell to 82.3 in March; the Case-Schiller Home Price Index (as of 12/31) dipped slightly to 150.39 from its highest level (150.92) since the financial crisis.**

- **Rolling 12-month CPI increased to 1.5% at the end of March; Capacity Utilization rose slightly to 79.2% in the month.**

- **Fed Funds rate remains at 0.25%, while the 10-year Treasury Yield finished March at 2.72%.**

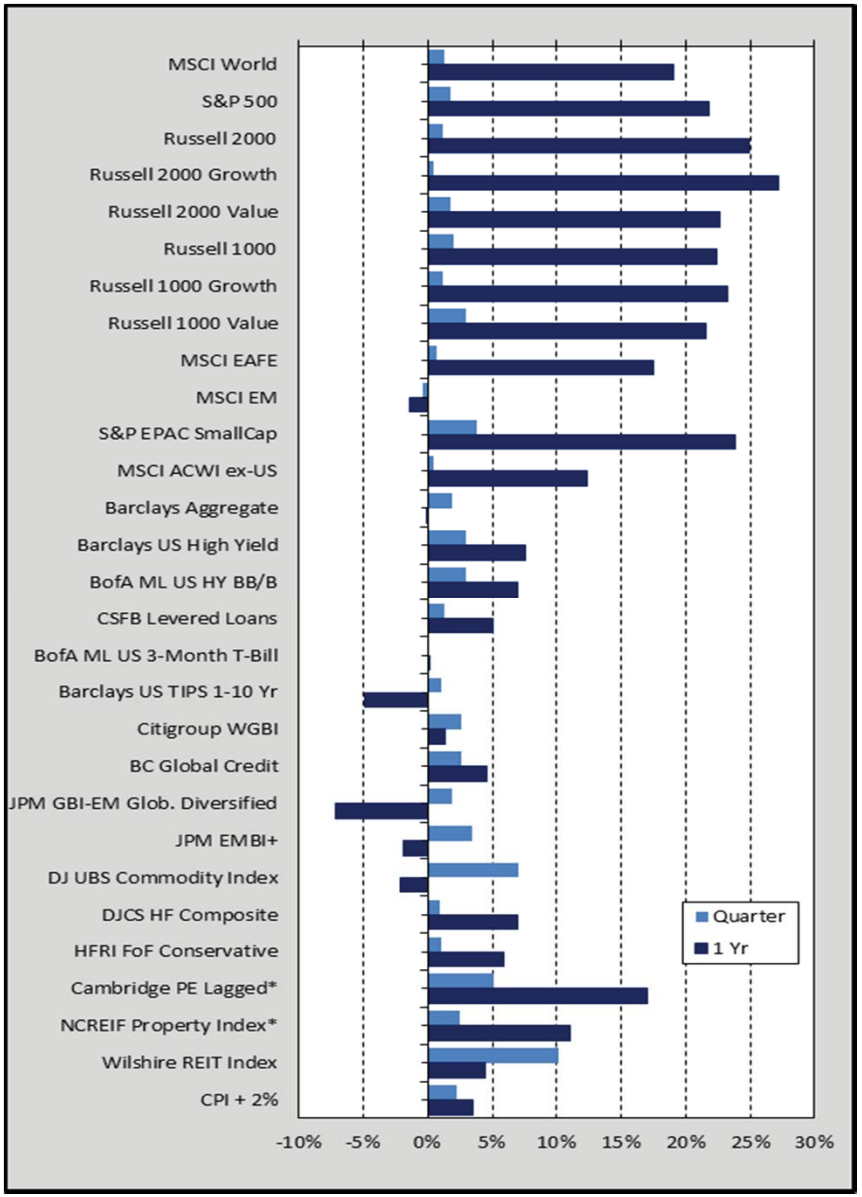
- **Fed balance sheets increased in early 2014, while European Central Bank balance sheets decreased.**
  - Large economies continue easing (Japan to the extreme), while the ECB tightens.

- **S&P valuations rose in March and remained above the 10-year and long-term averages, which are nearly equal at 16.4x, using current price/earnings ratios.**
  - Cyclically adjusted Shiller PE ratios, however, are well above the long-term average of 17.6x and above the 10-year average of 23.0x.

Market Environment – Q1 2014 Performance Summary

		Qtr.	1 Yr.	3 Yr.	5 Yr.	10 Yr.
World Equity Benchmarks						
MSCI World	World	1.3%	19.1%	10.2%	18.3%	6.8%
		Qtr.	1 Yr.	3 Yr.	5 Yr.	10 Yr.
Domestic Equity Benchmarks						
S&P 500	Large Core	1.8%	21.9%	14.7%	21.2%	7.4%
Russell 2000	Small Core	1.1%	24.9%	13.2%	24.3%	8.5%
Russell 2000 Growth	Small Growth	0.5%	27.2%	13.6%	25.2%	8.9%
Russell 2000 Value	Small Value	1.8%	22.6%	12.7%	23.3%	8.1%
Russell 1000	Large Core	2.0%	22.4%	14.7%	21.7%	7.8%
Russell 1000 Growth	Large Growth	1.1%	23.2%	14.6%	21.7%	7.9%
Russell 1000 Value	Large Value	3.0%	21.6%	14.8%	21.8%	7.6%
		Qtr.	1 Yr.	3 Yr.	5 Yr.	10 Yr.
International Equity Benchmarks						
MSCI EAFE	International Developed	0.7%	17.6%	7.2%	16.0%	6.5%
MSCI EM	Emerging Equity	-0.4%	-1.4%	-2.9%	14.5%	10.1%
S&P EPAC SmallCap	Small Cap Int'l	3.8%	23.9%	9.6%	21.2%	9.4%
MSCI ACWI ex-US	World ex-US	0.5%	12.3%	4.1%	15.5%	7.1%
		Qtr.	1 Yr.	3 Yr.	5 Yr.	10 Yr.
Domestic Fixed Income Benchmarks						
Barclays Aggregate	Core Bonds	1.8%	-0.1%	3.7%	4.8%	4.5%
Barclays US High Yield	High Yield	3.0%	7.5%	9.0%	18.2%	8.7%
BofA ML US HY BB/B	High Yield	3.0%	7.0%	8.5%	15.8%	7.9%
CSFB Levered Loans	Bank Loans	1.3%	5.0%	5.3%	12.2%	5.0%
BofA ML US 3-Month T-Bill	Cash	0.0%	0.1%	0.1%	0.1%	1.7%
Barclays US TIPS 1-10 Yr	Inflation	1.0%	-4.9%	2.2%	4.0%	4.0%
		Qtr.	1 Yr.	3 Yr.	5 Yr.	10 Yr.
Global Fixed Income Benchmarks						
Citigroup WGBI	World Gov. Bonds	2.7%	1.4%	1.9%	3.8%	4.2%
BC Global Credit	Global Bonds	2.6%	4.6%	5.8%	9.9%	5.6%
JPM GBI-EM Glob. Div.	Em. Mkt. Bonds (Local)	1.9%	-7.1%	1.1%	9.8%	9.3%
JPM EMBI+	Em. Mkt. Bonds	3.5%	-1.9%	6.7%	10.9%	8.3%
		Qtr.	1 Yr.	3 Yr.	5 Yr.	10 Yr.
Alternative Benchmarks						
DJ UBS Commodity Index	Commodity	7.0%	-2.1%	-7.4%	4.2%	0.4%
DJCS HF Composite	Hedge Fund	0.9%	7.0%	4.4%	8.7%	6.1%
HFRI FoF Conservative	Fund of Funds	1.1%	5.9%	2.7%	4.6%	2.6%
Cambridge PE Lagged*	Private Equity	5.1%	17.0%	15.5%	10.6%	15.2%
NCREIF Property Index*	Real Estate	2.5%	11.0%	11.9%	5.7%	8.4%
Wilshire REIT Index	REIT	10.1%	4.4%	10.5%	29.2%	8.2%
CPI + 2%	Inflation/Real Assets	2.3%	3.5%	3.9%	4.2%	4.6%

*As of 12/31/2013



First Quarter 2014 Market Review

Positives

- **Continued slow and steady economic growth**
  - A bit slower in the first quarter due to weather (maybe offset in Q2?)
  - Deleveraging continuing
- **Early stages of Taper generally accepted by marketplace**
  - Though priced in, "normalization" of rates appears optimistic
- **Developed world inflation is low**
  - Allows Fed continued flexibility to work through Taper
- **Emerging markets made some progress on adjustments**
  - Finally experiencing positive flows and early signs of positive performance
- **Volatility remains subdued and markets relatively stable**

Negatives

- **Potential geopolitical instability**
  - Russian invasion of Crimea has minimal economic impact
  - But tensions between Russia and West could have spillover effects
- **Benign market environment in Europe obscures challenging underlying economic conditions**
- **Inflation is low… maybe too low**
  - Global monetary stimulation has offset deflationary pressures
- **Continued slowing growth in China has global implications**
  - Could bring Chinese credit issues to forefront
- **Valuations beginning to stretch above long-term averages**
  - Developed Equity P/Es above median
  - Credit spreads approaching 2006-07 levels

Market Environment

Global Equity

- **U.S. stocks oscillated back and forth in the first quarter amid further guidance from the Federal Reserve.**
- **The S&P 500 Index rose 1.8%, while the Russell 2000 gained a modest 1.1%.**
- **International equities lagged U.S. markets, returning 0.7%, as measured by the MSCI ACWI ex-U.S. Index.**
  - Developed markets returned 0.7% as measured by the MSCI EAFE Index
  - Emerging markets returned -0.4% as measured by the MSCI Emerging Markets Index
- **Europe led non-U.S. equities as France and peripheral countries recorded robust gains. Italy and Ireland were two of the best markets for the quarter, with stocks returning roughly 14% so far this year.**
- **Despite rallying in March, emerging markets ended the quarter down 0.4% following Russia's takeover of Crimea and the continuing economic slowdown in China. Russia was the worst performing market with a -14.4% return, while Indonesia gained a hefty 21.3%.**

Private Equity

- **Private equity fund raising got off to a strong start in the first quarter with new commitments—at around $75.6 billion—keeping pace with commitments made in 2013.**
- **Asian fundraising totaled $10.8 billion in the first quarter, getting a shot in the arm as three firms raised over $1.0 billion each; Europe saw $12.0 billion of new commitments, of which 60% is to be invested in buyout and growth equity funds.**
- **Globally, buyout and growth equity commitments totaled $33.3 billion during the quarter, representing 44% of all funds raised so far this year, while energy, natural resources and infrastructure accounted for 19%.**
- **Venture capital fundraising hit $13.2 billion powered by five firms raising over $5 billion.**
- **Mezzanine funds, at $3.2 billion, accounted for only 4% of all new capital raised.**
- **Secondary funds raised only $3.1 billion in the first quarter, but we expect this number to increase to more than $20 billion as the year progresses with several large funds coming to market.**

Market Environment

Fixed Income

- **Bond markets rallied in the first quarter as investors snapped up safer, higher quality assets amid concerns around the crisis in Ukraine, an economic slowdown in China, and the unseasonably harsh winter in the U.S.**
- **The 10-year U.S. Treasury yield decreased 31 basis points to end the first quarter at 2.72%.**
- **The U.S. Credit Index gained 2.9% and the Long Duration Credit Index returned 6.3% in the first quarter. High yield bonds returned 3.0%.**
- **Investment grade credit spreads narrowed to 103 basis points, the lowest they have been since before the financial crisis. The yield spread on high yield bonds over Treasuries fell to a near record low of 3.58%.**
- **Intermediate-term Treasury Inflation-Protected Securities, or TIPS, gained 1.0% during the quarter.**
- **The Credit Suisse Leveraged Loan Index gained 1.3% during the first quarter.**
- **Local currency debt, as measured by the JP Morgan GBI-EM Index, gained 1.9%. Hard currency debt, boosted by declining Treasury yields, outperformed local currency debt during the quarter, posting returns of 3.5%.**

Market Environment

Commodities

- Commodities started the year with a bang, with the DJ-UBS Index returning 7.2% in the first quarter.
- Fears of a grain shortage following Russia's invasion of Ukraine powered returns of 8.4% in the grain sector.
- Heating oil rallied early in the quarter on the heels of unseasonably cold weather but subsequently retreated in March as temperatures returned to more normal levels, resulting in losses of 1.8% for energy.
- Precious metals declined 4% as copper prices fell amid the slowdown in China.

Real Estate

- NEPC continues to be neutral on core real estate in the U.S. and remains positive on non-core real estate, that is, value-add and opportunistic strategies, particularly in Europe.
- Within U.S. core real estate, fundamentals continue to improve with decreasing vacancy rates, increasing rents, limited new construction (outside of the apartment sector), and still attractive if narrowing income spreads relative to interest rates.
- In Europe, undervalued non-core properties and capital structure distress remain, creating more appealing prospects than in the U.S.
- Real estate debt strategies are appealing, particularly in Europe's distressed lending environment, although currency risk is a potential consideration.

Real Assets/Inflation-Linked Assets

- NEPC believes that energy, specifically in North America, represents an attractive opportunity in the up-stream and mid-stream parts of the energy value chain.
- Agriculture and metals/mining opportunities seem appealing based on long-term demographic trends despite a less certain short-term outlook.
- Timber is an area of portfolios where we would recommend underweight positions as total return targets are low with a relatively small market opportunity and managers seeking deals outside the U.S.

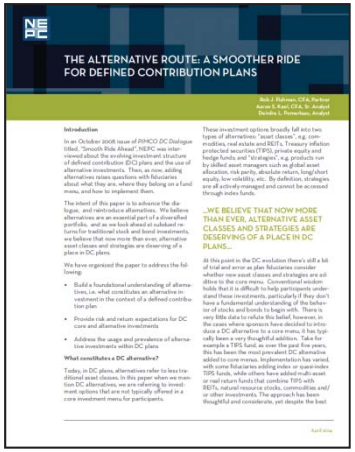
Outlook

- **Markets have generally shown resiliency so far in 2014**
  - Withstood adjustments in balance of payment challenged EM countries
  - Limited market reaction to Russia/Ukraine issues
- **U.S. taper has generally been accepted by markets**
  - Already reduced from $85 billion to $55 billion in monthly purchases
  - Rates remain low and accommodating
- **Slow and steady economic growth continues**
  - Inflation remains subdued
- **Continued low volatility may obscure underlying economic challenges**
  - European peripheral countries continue to face high unemployment
  - Many EM countries face further balance of payment adjustments
  - China faces slowing growth and potential credit issues
- **Valuations beginning to move beyond fair value**
  - While not stretched, equity P-E ratios are now above long-term averages
  - Credit spreads continue to move tighter
    - Ex: European peripheral debt
- **NEPC themes remain consistent**
  - Rebalance – remain diversified and balanced
  - Look for opportunities to be dynamic – particularly in credit
  - Allocate to emerging markets and private markets for higher returns in low return world

Highlights of First Quarter Happenings at NEPC

NEPC Research
Recent White Papers Posted

- *4Q Market Thoughts — "1997, 2007, or Something Else Altogether?"* (January 2014)
- *Moving in Different Directions: NEPC's 2014 Asset Allocation Letter* (January 2014), NEPC's Asset Allocation Committee
- *Annual Chairman's Letter* (March 2014), Richard M. Charlton, Chairman
- *Overlay Strategies: Increasing Portfolio Diversification Through Derivatives* (March 2014), Brian Roberts, CAIA, Senior Consultant
- *The Alternative Route: A Smoother Ride for Defined Contribution Plans* (April 2014), Rob J. Fishman, CFA, Partner; Aaron S. Keel, CFA, Senior Analyst; Deirdre L. Pomerleau, Analyst


THE ALTERNATIVE ROUTE: A SMOOTHER RIDE FOR DEFINED CONTRIBUTION PLANS

Rob J. Fishman, CFA, Partner
Aaron S. Keel, CFA, Sr. Analyst
Deirdre L. Pomerleau, Analyst

Introduction

In an October 2008 issue of *PIMCO DC Dialogue* titled, "Smooth Ride Ahead", NEPC was interviewed about the evolving investment structure of defined contribution (DC) plans and the use of alternative investments. Then, as now, adding alternatives raises questions with fiduciaries about what they are, where they belong on a fund menu, and how to implement them.

The intent of this paper is to advance the dialogue, and reintroduce alternatives. We believe alternatives are an essential part of a diversified portfolio, and as we look ahead at subdued returns for traditional stock and bond investments, we believe that now more than ever, alternative asset classes and strategies are deserving of a place in DC plans.

We have organized the paper to address the following:

- Build a foundational understanding of alternatives, i.e. what constitutes an alternative investment in the context of a defined contribution plan
- Provide risk and return expectations for DC core and alternative investments
- Address the usage and prevalence of alternative investments within DC plans

What constitutes a DC alternative?

Today, in DC plans, alternatives refer to less traditional asset classes. In this paper when we mention DC alternatives, we are referring to investment options that are not typically offered in a core investment menu for participants.

These investment options broadly fall into two types of alternatives: "asset classes", e.g. commodities, real estate and REITs, Treasury inflation protected securities (TIPS), private equity and hedge funds; and "strategies", e.g. products run by skilled asset managers such as global asset allocation, risk parity, absolute return, long/short equity, low volatility, etc. By definition, strategies are all actively-managed and cannot be accessed through index funds.

...WE BELIEVE THAT NOW MORE THAN EVER, ALTERNATIVE ASSET CLASSES AND STRATEGIES ARE DESERVING OF A PLACE IN DC PLANS...

At this point in the DC evolution there's still a lot of trial and error as plan fiduciaries consider whether new asset classes and strategies are suitable to the core menu. Conventional wisdom holds that it is difficult to help participants understand these investments, particularly if they don't have a fundamental understanding of the behavior of stocks and bonds to begin with. There is very little data to refute this belief, however, in the cases where sponsors have decided to introduce a DC alternative to a core menu, it has typically been a very thoughtful addition. Take for example a TIPS fund, as over the past five years, this has been the most prevalent DC alternative added to core menus. Implementation has varied, with some fiduciaries adding index or quasi-index TIPS funds, while others have added multi-asset or real return funds that combine TIPS with REITs, natural resource stocks, commodities and/or other investments. The approach has been thoughtful and considerate, yet despite the best

April 2014

Professional Staff Updates

- Tim McCusker, CFA, CAIA, FSA named Chief Investment Officer

NEPC's 19th Annual Client Conference

- May 13 and May 14, 2014
- Boston Convention Center
- Headline Speakers:
  - David M. Rubenstein, Co-Founder and Co-CEO, The Carlyle Group
  - Perry M. Traquina, CFA, Chairman and CEO, Managing Partner, Wellington Management Company

Appendix: SAA Policy History

Strategic Asset Allocation Policy (SAAP) History

- 7/1/75 – 12/31/79 – 40% S&P 500/60% Barclays Capital Aggregate
- 1/1/80 – 12/31/83 – 50% S&P 500/50% Barclays Capital Aggregate
- 1/1/84 – 12/31/91 – 60% S&P 500/40% Barclays Capital Aggregate
- 1/1/92 – 12/31/94 – 50% S&P 500/10% MSCI EAFE/40% Barclays Capital Aggregate
- 1/1/95 – 6/30/97 – 45% S&P 500/15% MSCI EAFE/40% Barclays Capital Aggregate
- 7/1/97 – 12/31/99 – 50% S&P 500/15% MSCI EAFE/35% Barclays Capital Aggregate
- 1/1/00 – 9/30/03 – 53% S&P 500/17% MSCI EAFE/30% Barclays Capital Aggregate
- 10/1/03 – 12/31/06 – 53% S&P 500/15% MSCI EAFE/ACWI ex-U.S.[1]/26% Barclays Capital Aggregate/6% NCREIF ODCE (lagged one quarter)
- 1/1/07 – 10/31/2009 – 31% S&P 500/7% S&P 400/7% S&P 600/18% MSCI ACWI ex-U.S./5% Russell 2000 (lagged one quarter)/26% Barclays Capital Aggregate/6% NCREIF ODCE (lagged one quarter)
- 11/1/2009 – 6/30/2012 – 28% S&P 500/6% S&P 400/6% S&P 600/13% MSCI EAFE/2% MSCI EAFE Small Cap/3% MSCI Emerging Markets/7% Russell 2000 (lagged one quarter)/24% Barclays Capital Aggregate/2% Barclays Capital High Yield/6% NCREIF ODCE (lagged one quarter)/3% Dow Jones/UBS Commodities Index
- **7/1/2012 – Present – 23% S&P 500/5% S&P 400/5% S&P 600/14% MSCI EAFE/3% MSCI EAFE Small Cap/6% MSCI Emerging Markets/7% Russell 2000 (lagged one quarter)/13% Barclays Capital Aggregate/5% Barclays Capital High Yield/4% JP Morgan GBI-EM Global Diversified/3% S&P/LSTA Levered Loan Index + 250 basis points (lagged one quarter)/8% NCREIF ODCE (lagged one quarter)/4% Dow Jones/UBS Commodities Index**

- *Interim SAA Policy: 25% S&P 500/5% S&P 400/5% S&P 600/14% MSCI EAFE/3% MSCI EAFE Small Cap/6% MSCI Emerging Markets/6% Russell 2000 (lagged one quarter)/15% Barclays Capital Aggregate/5% Barclays Capital High Yield/4% JP Morgan GBI-EM Global Diversified/2% S&P/LSTA Levered Loan Index + 250 basis points (lagged one quarter)/6% NCREIF ODCE (lagged one quarter)/4% Dow Jones/UBS Commodities Index

Note: Interim SAA Policy includes a proration of 1% Private Equity, 1% Private Debt, and 2% Real Estate, which are unfunded. Private Equity was prorated to domestic equity; Real Estate was prorated to domestic equity and fixed income; Private Debt was prorated to fixed income. Recently approved Strategic Asset Allocation Policy effective July 1, 2012.

[1]MSCI EAFE/ACWI ex-U.S. Benchmark is the MSCI EAFE Index prior to 10/1/2005 and the MSCI ACWI ex-U.S. thereafter.

Note: All MSCI indices changed from Gross to Net of dividend withholding taxes effective 1/1/2014.

ASRS Custom Asset Class Benchmark History

- **ASRS Custom Total Equity Benchmark** was 77% S&P 500, 23% MSCI EAFE through 12/31/1999; 76% S&P 500, 24% MSCI EAFE through 9/30/2003; 78% S&P 500, 22% MSCI EAFE/ACWI ex-U.S.[1] through 12/31/2006; 49% S&P 500, 11% S&P 400, 11% S&P 600, 29% MSCI ACWI ex-U.S. through 10/31/2009; 48% S&P 500, 10% S&P 400, 10% S&P 600, 23% MSCI EAFE, 4% MSCI EAFE Small Cap, 5% MSCI Emerging Markets through 6/30/2012; 41% S&P 500, 9% S&P 400, 9% S&P 600, 25% MSCI EAFE, 5% MSCI EAFE Small Cap, 11% MSCI Emerging Markets thereafter.

- **ASRS Custom Domestic Equity Benchmark** was S&P 500 through 12/31/2006; 74% S&P 500, 13% S&P 400, 13% S&P 600 through 12/31/2010; 70% S&P 500, 15% S&P 400, and 15% S&P 600 thereafter.

- **ASRS Custom International Equity Benchmark** was MSCI EAFE through 9/30/2005; MSCI ACWI ex-U.S. through 12/31/2010; 72% MSCI EAFE, 11% MSCI EAFE Small Cap and 17% MSCI Emerging Markets through 6/30/2012; 61% MSCI EAFE, 13% MSCI EAFE Small Cap and 26% MSCI Emerging Markets thereafter.

- **ASRS Custom Public Markets Fixed Income Benchmark** was Barclays Capital U.S. Aggregate Index through 12/31/2010; 93% Barclays Capital U.S. Aggregate Index, 7% Barclays Capital U.S. High Yield Bond Index through 12/31/2012; 59% Barclays Capital U.S. Aggregate Index, 23% Barclays Capital U.S. High Yield Bond Index, 18%JP Morgan GBI-EM Global Diversified thereafter.

- **ASRS Custom GTAA Benchmark** was 56% S&P 500, 16% MSCI EAFE, 28% Barclays Capital Aggregate through 9/30/2011; 50% S&P 500, 19% MSCI EAFE, 28% Barclays Capital Aggregate, and 3% DJ UBS Commodities Index through 06/30/2012; 43% S&P 500, 25% MSCI EAFE, 28% Barclays Capital Aggregate, and 4% DJ UBS Commodities Index thereafter.

- **ASRS Custom Inflation-Linked Benchmark** was 100% Barclays Capital U.S. TIPS through 7/31/2010; 50% Barclays Capital U.S. TIPS, 50% DJ UBS Commodities Index through 8/31/2010; 30% Barclays Capital U.S. TIPS, 70% DJ UBS Commodities Index through 5/31/2011; 100% DJ UBS Commodities Index thereafter.

[1]MSCI EAFE/ACWI ex-U.S. Benchmark is the MSCI EAFE Index prior to 10/1/2005 and the MSCI ACWI ex-U.S. thereafter.

Note: All MSCI indices changed from Gross to Net of dividend withholding taxes effective 1/1/2014.

Reporting Methodology

- **The client's custodian bank is NEPC's preferred data source unless otherwise directed. NEPC reconciles custodian data to manager data. If the custodian cannot provide accurate data, manager data may be used.**

- **Trailing time period returns are determined by geometrically linking the holding period returns, from the first full month after inception to the report date. Rates of Return are annualized when the time period is longer than a year. Performance is presented gross and/or net of fees as indicated.**

- **For managers funded in the middle of a month, the 'since inception' return will start with the first full month, although actual inception dates and cash flows are included in all respective Composite calculations.**

- **This report may contain forward-looking statements that are based on NEPC's estimates, opinions and beliefs, but NEPC cannot guarantee that any plan will achieve its targeted return or meet other goals.**

Information Disclaimer

- **Past performance is no guarantee of future results.**
- **All investments carry some level of risk. Diversification and other asset allocation techniques are not guaranteed to ensure profit or protect against losses.**
- **Some index returns displayed in this report or used in calculation of a policy, allocation or custom benchmark may not be available from the source or may be preliminary and subject to change.**
- **NEPC's source for portfolio pricing, calculation of accruals, and transaction information is the Plan's custodian bank. Information on market indices and security characteristics is received from other sources external to NEPC. While NEPC has exercised reasonable professional care in preparing this report, we cannot guarantee the accuracy of all source information contained herein.**
- **This report is provided as a management aid for the client's internal use only. Performance in this report does not constitute a recommendation by NEPC.**
- **This report may contain confidential or proprietary information and may not be copied or redistributed to any party not legally entitled to receive it.**

ARIZONA STATE RETIREMENT SYSTEM

3300 NORTH CENTRAL AVENUE • PO BOX 33910 • PHOENIX, AZ 85067-3910 • PHONE (602) 240-2000
7660 EAST BROADWAY BOULEVARD • SUITE 108 • TUCSON, AZ 85710-3776 • PHONE (520) 239-3100
TOLL FREE OUTSIDE METRO PHOENIX AND TUCSON 1 (800) 621-3778
EMAIL ADDRESS: ASKMAC@AZASRS.GOV • WEB ADDRESS: WWW. AZASRS.GOV

Paul Matson
Director

MEMORANDUM

TO: Mr. Tom Manos, Chair, Arizona State Retirement System (ASRS) Board

FROM: Mr. Paul Matson, Director

DATE: June 17, 2014

RE: **Agenda Item #9**: Presentation, Discussion and Appropriate Action Regarding ASRS Board Elections

Purpose

The election of the Board Chair and Vice-chair for Fiscal Year 2014/2015.

Background

Pursuant to the ASRS Board Governance Policy Handbook, the ASRS Board will elect a Board Chair and Vice-chair. Unless the Board motions otherwise, the Chair and Vice-chair terms will become effective July 1, 2014, and will continue through June 30, 2015.

ARIZONA STATE RETIREMENT SYSTEM

3300 NORTH CENTRAL AVENUE • PO BOX 33910 • PHOENIX, AZ 85067-3910 • PHONE (602) 240-2000
7660 EAST BROADWAY BOULEVARD • SUITE 108 • TUCSON, AZ 85710-3776 • PHONE (520) 239-3100
TOLL FREE OUTSIDE METRO PHOENIX AND TUCSON 1 (800) 621-3778
EMAIL ADDRESS: ASKMAC@AZASRS.GOV • WEB ADDRESS: WWW. AZASRS.GOV

Paul Matson
Director

MEMORANDUM

TO: Mr. Tom Manos, Chair, Arizona State Retirement System (ASRS) Board

FROM: Mr. Paul Matson, Director
Mr. Bernard Glick, Chief Internal Auditor

DATE: June 16, 2014

RE: Internal Audit Review of Internal Investment Validation for the month ending May 31, 2014

The Internal Audit Division reviewed 1,050 trade transactions in the month of May on all the activity in the E2, E3, E4, E6, E7, E8, E9 and F2 accounts. Our review included:

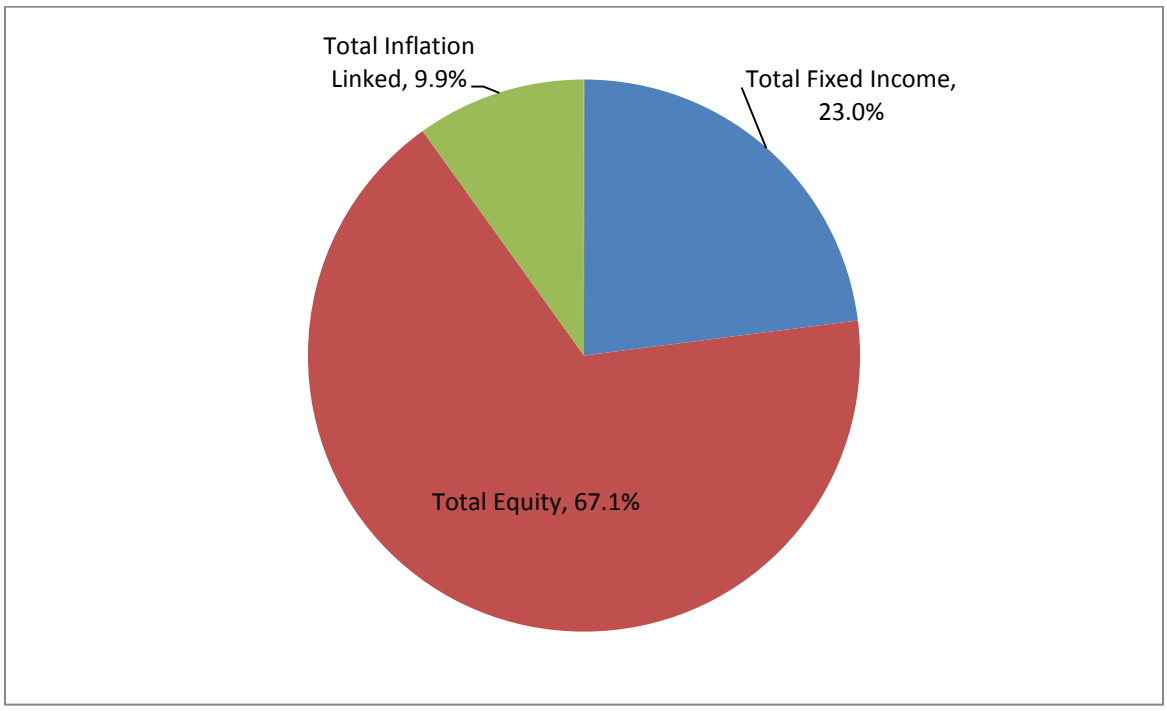
- Determining that the transaction was properly approved
- Reviewing the transaction for mathematical accuracy
- Ensuring that the description and ticker symbol matched the CUSIP number
- Reconciliation of transaction from trade ticket to custody bank transaction download
- Other tests that we deemed appropriate

No infractions were noted during our review. Based on this review, we believe the procedures for executing and reporting internal investment transactions have been followed for this time reportable period.

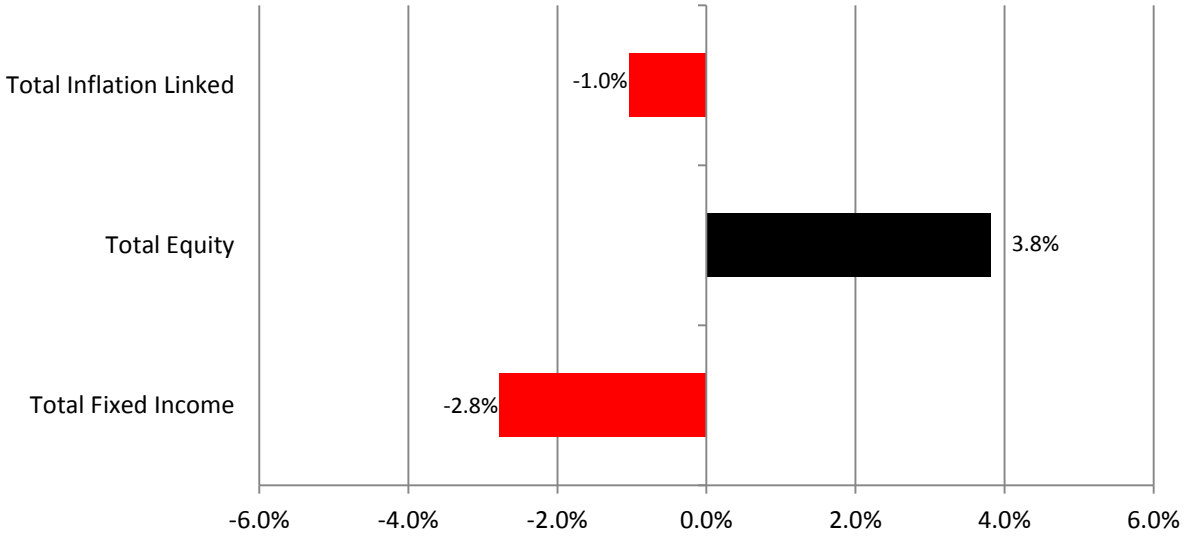
cc: Gary Dokes, Chief Investment Officer
Gloria Trujillo, Administrative Project Analyst

TOTAL FUND POSITIONING – 5/31/14

ACTUAL PORTFOLIO



ACTUAL PORTFOLIO (ASSUMED GTAA ALLOCATION VS. ADJUSTED SAA POLICY *)



**Real Estate and Private Equity actual weight is equal to policy weight during the implementation of the asset class.*

**Over/Underweights include both GTAA positions as well as IMD tactical considerations.*

Note: Opportunistic & Private Debt, Opportunistic Private Equity, Farmland & Timber, Real Estate and Private Equity market values are reported on a quarter-lag and adjusted to include the current quarter's cash flows. Within the Assumed GTAA Allocation vs. Adjusted SAA Policy chart, Real Estate was prorated to domestic equity, international equity and fixed income. Private Equity was prorated to domestic equity.

Pension (Plan, System, HBS Assets) — ASRS Market Value Report — As of: Friday, May 30, 2014

Account Manager	Account Manager Style	Fixed Income		Equity		Inflation Linked		Total	Pct of Fund
		Active	Enh/Passive	Active	Enh/Passive	Active	Enh/Passive		
State Street B&T: Boston	Master Cash & Pension Acct.		162,815,927					162,815,927	0.48%
	Cash Total							**$162,815,927**	0.48%
GTAA Managers (2)	Active GTAA	1,108,500,300						1,108,500,300	3.27%
Blackrock: San Francisco	Passive (Intermediate Gov Credit)		23,896,767					23,896,767	0.07%
ASRS: Phoenix	Enhanced Passive F2		1,977,765,294					1,977,765,294	5.83%
Blackrock: San Francisco	Passive (US Debt Index)		711,390,076					711,390,076	2.10%
	Core Fixed Income Total							**$3,821,754,993**	11.27%
								Core Fixed Income Policy	**13.00%**
Columbia: Minneapolis	Active	743,420,187						743,420,187	2.19%
Shenkman: Connecticut	Active	74,409,938						74,409,938	0.22%
JP Morgan: Indianapolis	Active	328,122,039						328,122,039	0.97%
	High Yield Fixed Income Total							**$1,145,952,165**	3.38%
								High Yield Fixed Income Policy	**5.00%**
	US Fixed Income Total							**$4,967,707,158**	14.64%
								US Fixed Income Policy Range: 8% - 28%	**18.00%**
PIMCO (local): Newport Beach	Active	348,494,510						348,494,510	1.03%
Ashmore (blended): London	Active	562,226,722						562,226,722	1.66%
	EM Debt Total							**$910,721,232**	2.68%
								EM Debt Policy	**4.00%**
	Opportunistic Debt							**$849,822,562**	2.50%
								Opportunistic Debt Policy Range: 0% - 10%	**0.00%**
	Private Debt Total							**$902,116,163**	2.66%
								Private Debt Policy	**3.00%**
	Fixed Income Total							**$7,793,183,042**	22.97%
								Total Fixed Income Policy Range: 15% - 35%	**25.00%**
Intech: FL	Active (Growth)			524,568,291				524,568,291	1.55%
LSV: Chicago	Active (Value)			786,316,797				786,316,797	2.32%
GTAA Managers (2)	Active GTAA			1,114,746,317				1,114,746,317	3.29%
ASRS: Phoenix	Passive E2				4,912,588,329			4,912,588,329	14.48%
ASRS: Phoenix	Enhanced Passive E7				791,134,515			791,134,515	2.33%
ASRS: Phoenix	Enhanced Passive E8				509,472,720			509,472,720	1.50%
ASRS: Phoenix	Risk Factor Portfolio				500,629,963			500,629,963	1.48%
	Large Cap Equity Total							**$9,139,470,159**	26.94%
								Large Cap Policy	**23.00%**
Wellington: Boston	Active (Core)			418,089,739				418,089,739	1.23%
CRM: New York	Active (Value)			99,100,622				99,100,622	0.29%
ASRS: Phoenix	Passive E3 (Growth)				509,238,459			509,238,459	1.50%
ASRS: Phoenix	Passive E4 (Value)				526,180,615			526,180,615	1.55%
	Mid Cap Equity Total							**$1,552,609,435**	4.58%
								Mid Cap Policy	**5.00%**
TimesSquare: New York	Active SMID (Growth)			461,772,531				461,772,531	1.36%
DFA: Santa Monica	Active (Value)			409,312,119				409,312,119	1.21%
Champlain:Vermont	Active (Core)			97,507,711				97,507,711	0.29%
ASRS: Phoenix	Passive E6				483,750,075			483,750,075	1.43%
	Small Cap Equity Total							**$1,452,342,436**	4.28%
								Small Cap Policy	**5.00%**
	U.S. Equity Total							**$12,144,422,031**	35.80%
								US Equity Policy Range: 26% - 38%	**33.00%**
Brandes: San Diego	Active (Value)			549,067,070				549,067,070	1.62%
Aberdeen: Edinburgh	Active (Value)			518,997,351				518,997,351	1.53%
Hansberger: Ft. Lauderdale	Active (Growth)			345,286,274				345,286,274	1.02%
Walter Scott: Edinburgh	Active (Growth)			238,486,640				238,486,640	0.70%
GTAA Managers (2)	Active GTAA			1,063,819,276				1,063,819,276	3.14%
Blackrock: San Francisco	Passive (EAFE)				2,417,751,406			2,417,751,406	7.13%
	Large Cap Developed Non-US Equity Total							**$5,133,418,253**	15.13%
								Large Cap Developed Policy	**14.00%**
AQR: Greenwich	Active (EAFE SC)			178,232,590				178,232,590	0.53%
DFA: Santa Monica	Active (EAFE SC)			226,371,709				226,371,709	0.67%
Franklin Templeton: San Mateo	Active (EAFE SC)			415,906,369				415,906,369	1.23%
Blackrock: San Francisco	Passive (EAFE SC)				469,212,977			469,212,977	1.38%
	Small Cap Developed Non-US Equity Total							**$1,289,727,976**	3.80%
								Small Cap Developed Policy	**3.00%**
William Blair: Chicago	Active (EM)			461,762,584				461,762,584	1.36%
Eaton Vance: Boston	Active (EM)			513,528,765				513,528,765	1.51%
LSV: Chicago	Active (EM)			308,747,094				308,747,094	0.91%
Blackrock: San Francisco	Passive (EM)				687,901,238			687,901,238	2.03%
	Emerging Markets Equity Total							**$1,971,939,681**	5.81%
								Emerging Markets Policy	**6.00%**
	Non-US Equity Total							**$8,395,085,910**	24.75%
								Non-US Equity Policy Range: 16% - 28%	**23.00%**
	Private Equity Total							**$2,018,830,127**	5.95%
								Private Equity Policy Range: 5% - 9%	**7.00%**
	Opportunistic Equity							**$204,841,646**	0.60%
								Opportunistic Equity Policy Range: 0% - 3%	**0.00%**
	Equity Total							**$22,763,179,713**	67.10%
								Total Equity Policy Range: 53% - 73%	**63.00%**
Gresham: New York						849,432,638		849,432,638	2.50%
GTAA Managers (2)	Active GTAA					345,588,902		345,588,902	1.02%
	Commodities Total							**$1,195,021,540**	3.52%
								Commodities Policy Range: 1% - 7%	**4.00%**
GTAA Manager (1)	Active GTAA					54,828,894		54,828,894	0.16%
	Real Estate Total							**$2,074,445,895**	6.11%
								Real Estate Policy Range: 6% - 10%	**8.00%**
	Infrastructure Total							**$0**	0.00%
								Infrastructure Policy Range: 0% - 3%	**0.00%**
	Farmland & Timber Total					99,329,710		**$99,329,710**	0.29%
								Farmland & Timber Policy Range: 0% - 3%	**0.00%**
	Opportunistic Inflation Linked Total							**$0**	0.00%
								Opportunistic I/L Policy Range: 0% - 3%	**0.00%**
	Inflation Linked Total							**$3,368,797,146**	9.93%
								Inflation Linked Policy Range: 7%-15%	**12.00%**
	TOTAL Amounts	$4,067,492,416	$3,725,690,626	$10,955,306,190	$11,807,873,524	$3,468,126,856	$0	**$33,925,159,901**	**Total Fund**
	TOTAL Percent	11.99%	10.98%	32.29%	34.81%	10.22%	0.00%		

Asset Class	Actual Portfolio	SAA Policy: Target (Range)	Rebalancing Assumed Port	Rebalancing Adj Policy	Assumed - Adjusted % diff	Assumed - Adjusted $ diff	Policy Band check Actual - Adj	Passive Min	Passive Actual
Cash	0.48%								
Core	11.27%	13%						50%	72%
High Yield	3.38%	5%							
US Fixed Income	14.64%	18% (8-28%)	14.90%	18.53% (9-29%)	-3.63%	-$1,231,089,296	OK		
EM Debt	2.68%	4%		4.00%					
Opportunistic Debt	2.50%	0% (0-10%)	2.50%	0% (0-10%)	2.50%	$849,822,562	OK		
Private Debt	2.66%	3%		3.00%					
Total Fixed Income	**22.97%**	**25% (15-35%)**	**22.75%**	**25.53% (16-36%)**	**-2.78%**	**-$943,190,532**	**OK**		
Large Cap	26.94%	23%							
Mid Cap	4.58%	5%							
Small Cap	4.28%	5%							
US Equity	**35.80%**	**33% (26-38%)**	**37.19%**	**34.86% (28-40%)**	**2.33%**	**$789,046,100**	**OK**	**50%**	**65%**
Developed Large Cap	15.13%	14%							
Developed Small Cap	3.80%	3%							
Emerging Markets	5.81%	6%							
Non-US Equity	**24.75%**	**23% (16-28%)**	**24.33%**	**23.47% (16-28%)**	**0.86%**	**$290,459,055**	**OK**	**30%**	**43%**
Private Equity	5.95%	7% (5-9%)	5.95%	5.95% (4-8%)	0.00%	$0	OK		
Opportunistic Equity	0.60%	0% (0-3%)	0.60%	0% (0-3%)	0.60%	$204,841,646	OK		
Total Equity	**67.10%**	**63% (53-70%)**	**68.07%**	**64.28% (54-71%)**	**3.79%**	**$1,284,346,801**	**OK**		
Commodities	3.52%	4% (1-7%)	2.94%	4.08% (1-7%)	-1.14%	-$385,657,086	OK		
Real Estate	6.11%	8% (6-10%)	5.95%	6.11% (4-8%)	-0.16%	-$54,828,894	OK		
Infrastructure	0.00%	0% (0-3%)	0.00%	0% (0-3%)	0.00%	$0	OK		
Farmland & Timber	0.29%	0% (0-3%)	0.29%	0% (0-3%)	0.29%	$99,329,710	OK		
Opportunistic I/L	0.00%	0% (0-3%)	0.00%	0% (0-3%)	0.00%	$0	OK		
Total Inflation Linked	**9.93%**	**12% (8-16%)**	**9.18%**	**10.19% (6-14%)**	**-1.01%**	**-$341,156,270**	**OK**		
Total	**100.00%**	**100%**	**100.00%**	**100.00%**	**0.00%**	**$0**		**30%**	**42%**
								Internally Managed Portfolios:	
Total GTAA								**$9,710,130,008**	**29%**
Bridgewater	$3,086,948,160	9.1%							
Windham	$600,535,529	1.8%							
Total	**$3,687,483,689**	**10.9%**							
Policy	**10% ±5%**	**OK**							

Opportunistic definitions:
1) Tactical in nature: Function of market dislocation AND
2a) Outside SAA benchmark, OR
2b) Within SAA benchmark but absolute return oriented

ARIZONA STATE RETIREMENT SYSTEM
Investment Management Division

ASRS Pension and HBS Assets
Public Securities Markets
Investment Managers Performance Summary

Period Ending May 31, 2014
FINAL

				Net Returns (%)								Excess Returns (basis points)							
								Annualized								Annualized			
	Style	Inception	Amount ($mil.)	Month	3 Months	YTD	1 Year	3 Years	5 Years	10 Years	ITD	Month	3 Months	YTD	1 Year	3 Years	5 Years	10 years	ITD
US EQUITY LARGE CAP																			
E2 MODEL	INDEXED	04/01/1997	4,913	2.35	3.98	4.96	20.40	15.12	18.41	7.81	7.61	0	0	-1	-5	-3	1	4	8
S&P 500 INDEX				2.35	3.97	4.97	20.45	15.15	18.40	7.77	---								
INTECH LARGE CAP	QUANTITATIVE	01/01/2003	525	3.57	1.51	3.93	22.12	14.06	18.23	7.95	9.97	22	-140	-118	-25	-162	-66	-17	63
S&P/CITIGROUP 500 GROWTH				3.35	2.91	5.11	22.36	15.68	18.89	8.12	---								
LSV ASSET MANAGEMENT	QUANTITATIVE	01/01/2003	786	1.61	5.45	5.31	23.68	16.95	20.78	9.85	11.74	34	31	50	525	230	286	250	253
LSV CUSTOM INDEX				1.27	5.14	4.81	18.43	14.65	17.93	7.36	---								
E7	INDEXED	08/01/2012	791	1.40	6.75	6.39	18.36	---	---	---	19.44	4	-6	-4	-5	---	---	---	14
MSCI USA High Dividend Yield Index				1.36	6.81	6.44	18.41	---	---	---	---								
E8	INDEXED	08/01/2012	509	1.32	3.57	4.82	15.77	---	---	---	16.66	16	15	13	40	---	---	---	77
MSCI USA Minimum Volatility Index				1.16	3.42	4.70	15.37	---	---	---	---								
TOTAL US EQUITY LARGE CAP			$ 7,524																
US EQUITY MID CAP																			
WELLINGTON MANAGEMENT COMPANY LLP	FUNDAMENTAL	07/01/2002	418	2.27	-0.42	5.01	22.91	13.92	19.38	12.02	11.73	50	-98	179	486	98	-146	171	116
S&P 400 MIDCAP INDEX				1.78	0.55	3.23	18.04	12.94	20.84	10.31	---								
E3 MODEL	INDEXED	12/01/2000	509	1.88	-1.51	1.13	15.77	11.74	21.21	10.93	8.65	1	-4	2	15	25	50	55	58
S&P/CITIGROUP 400 GROWTH				1.87	-1.47	1.11	15.62	11.49	20.71	10.37	---								
CRM MID CAP VALUE	FUNDAMENTAL	01/01/2004	99	1.35	0.85	2.16	18.61	10.73	16.59	9.77	10.07	-32	-184	-331	-197	-374	-441	-42	-6
E4 MODEL	INDEXED	07/01/2002	526	1.71	2.61	5.41	20.38	14.33	20.95	10.45	10.83	4	-9	-7	-21	-14	-5	26	21
S&P/CITIGROUP 400 VALUE				1.68	2.69	5.47	20.58	14.47	21.00	10.19	---								
TOTAL US EQUITY MID CAP			$ 1,553																
US EQUITY SMALL CAP																			
DIMENSIONAL FUND ADVISORS EQFD	QUANTITATIVE	09/01/1998	409	1.00	0.96	1.17	21.63	15.14	23.14	10.41	12.62	31	128	64	92	-69	211	48	126
DFA BLENDED BENCHMARK				0.68	-0.31	0.53	20.71	15.83	21.02	9.93	---								
TIMESSQUARE CAPITAL MANAGEMENT	FUNDAMENTAL	04/01/2005	462	0.60	-4.12	-3.69	17.30	15.23	22.16	---	12.50	-72	21	-246	-121	298	119	---	268
RUSSELL 2500 GROWTH				1.32	-4.33	-1.23	18.51	12.25	20.97	---	---								
CHAMPLAIN INVESTMENT PARTNERS LLC	FUNDAMENTAL	01/01/2008	98	0.17	-1.88	-4.40	12.35	10.87	18.29	---	9.48	-10	-3	-297	-736	-346	-292	---	-2
E6	INDEXED	02/01/2007	484	0.30	-1.92	-1.53	19.58	14.21	21.03	---	8.29	3	-8	-10	-13	-12	-17	---	37
S&P 600 SMALL CAP				0.27	-1.85	-1.43	19.71	14.33	21.20	---	---								
TOTAL US EQUITY SMALL CAP			$ 1,452																
TOTAL US EQUITY			$ 10,529																
INTERNATIONAL DEVELOPED LARGE CAP																			
BRANDES INVESTMENT PARTNERS INT EQ	FUNDAMENTAL	10/01/1998	549	1.82	4.42	6.21	23.13	8.39	10.84	7.35	9.94	20	198	244	497	72	-152	-119	303
BRANDES CUSTOM INDEX				1.62	2.44	3.78	18.16	7.68	12.37	8.55	---								
ABERDEEN ASSET MANAGEMENT	FUNDAMENTAL	03/01/2011	519	1.37	6.25	7.33	11.75	6.66	---	---	7.63	-26	381	355	-641	-101	---	---	30
BGI EAFE INDEX	INDEXED	07/01/2009	2,419	1.69	2.63	3.99	18.28	7.59	---	---	12.09	6	19	22	12	-9	---	---	-10
WALTER SCOTT & PARTNERS	FUNDAMENTAL	04/01/2011	238	1.71	2.89	0.46	8.49	4.82	---	---	6.14	9	46	-332	-967	-286	---	---	-216
MSCI EAFE NET				1.62	2.44	3.78	18.16	7.68	---	---	---								

STATE STREET.

ARIZONA STATE RETIREMENT SYSTEM
Investment Management Division

ASRS Pension and HBS Assets
Public Securities Markets
Investment Managers Performance Summary

Period Ending May 31, 2014
FINAL

				Net Returns (%)								Excess Returns (basis points)							
								Annualized								Annualized			
	Style	Inception	Amount ($mil.)	Month	3 Months	YTD	1 Year	3 Years	5 Years	10 Years	ITD	Month	3 Months	YTD	1 Year	3 Years	5 Years	10 years	ITD
HANSBERGER GLOBAL INVESTORS LC	FUNDAMENTAL	08/01/2005	345	1.12	1.73	-0.20	12.39	4.01	9.68	---	6.02	-51	-71	-398	-576	-367	-268	---	-152
HANSBERGER CUSTOM INDEX				1.62	2.44	3.78	18.16	7.68	12.37	---	---								
TOTAL INTERNATIONAL DEVELOPED LARGE CAP			$ 4,071																
INTERNATIONAL DEVELOPED SMALL CAP																			
AQR CAPITAL		06/01/2013	178	1.59	-0.94	2.86	22.69	---	---	---	22.69	19	-99	-110	3	---	---	---	3
BLACKROCK EAFE SMALL CAP	INDEXED	06/01/2010	470	1.42	0.12	3.95	22.57	8.67	---	---	15.47	2	6	-1	-9	-30	---	---	-24
DIMENSIONAL FUND ADVISORS INTL SC	QUANTITATIVE	09/01/2005	226	0.35	0.60	6.04	26.14	8.85	13.44	---	7.12	-105	54	208	348	-12	-219	---	19
FRANKLIN TEMPLETON INVESTMENTS	FUNDAMENTAL	04/01/2011	416	-0.88	-1.15	-0.11	20.95	11.70	---	---	12.34	-228	-120	-407	-172	273	---	---	294
MSCI EAFE SMALL CAP NET				1.40	0.05	3.96	22.67	8.97	---	---	---								
TOTAL INTERNATIONAL DEVELOPED SMALL CAP			$ 1,291																
INTERNATIONAL EMERGING MARKETS																			
BLACKROCK EMERGING MARKETS	INDEXED	10/01/2010	681	3.49	7.00	3.18	4.11	-2.00	---	---	0.92	-1	-2	-21	-37	-52	---	---	-50
EATON VANCE EMERGING MARKET EQUITY	QUANTITATIVE	12/01/2010	510	3.65	7.47	5.36	7.75	0.60	---	---	2.76	16	45	197	327	208	---	---	133
LSV EMERGING MARKET EQUITY	QUANTITATIVE	12/01/2010	306	4.36	10.06	5.04	5.21	-0.42	---	---	2.77	87	304	165	73	105	---	---	134
WILLIAM BLAIR & COMPANY	FUNDAMENTAL	11/01/2010	458	3.47	5.43	4.54	5.72	2.70	---	---	2.94	-2	-159	115	124	418	---	---	230
MSCI EMF NET				3.49	7.02	3.39	4.48	-1.48	---	---	---								
TOTAL INTERNATIONAL EMERGING MARKETS			$ 1,955																
TOTAL INTERNATIONAL EQUITY			$ 7,316																
RISK FACTOR PORTFOLIO																			
RISK FACTOR PORTFOLIO	OVERLAY	06/01/2013	501	2.55	2.62	4.37	19.67	---	---	---	19.67								
TOTAL RISK FACTOR PORTFOLIO			$ 501																
TOTAL EQUITY W/ RISK FACTOR OVERLAY			$ 18,346																
CORE FIXED INCOME																			
BGI US DEBT FD	CORE	10/01/2004	711	1.16	---	---	---	---	---	---	---	2	---	---	---	---	---	---	---
F2 MODEL	INDEXED	10/01/2000	1,978	1.08	1.71	3.67	2.92	3.84	5.20	5.22	5.73	-6	-10	-20	21	29	24	23	15
Barclays Aggregate				1.14	1.82	3.87	2.71	3.55	4.96	4.99	---								
BGI GOVT/CRDTBD INDEX	INDEXED	11/01/2008	24	0.79	1.02	2.38	1.82	2.91	4.27	---	5.20	0	1	6	12	11	6	---	9
Barclays Gov/Credit Int				0.79	1.00	2.32	1.70	2.80	4.20	---	---								
TOTAL CORE FIXED INCOME			$ 2,713																
HIGH YIELD FIXED INCOME																			
COLUMBIA MANAGEMENT INV. ADVISORS, LLC	FUNDAMENTAL	10/01/2009	743	0.84	1.67	4.42	7.50	8.66	---	---	10.91	-8	-13	-17	-40	-16	---	---	-72
JP MORGAN HIGH YIELD		07/01/2013	328	0.71	1.25	3.88	---	---	---	---	10.14	-21	-55	-71	---	---	---	---	-66

STATE STREET.

ARIZONA STATE RETIREMENT SYSTEM
Investment Management Division

ASRS Pension and HBS Assets
Public Securities Markets
Investment Managers Performance Summary

Period Ending May 31, 2014
FINAL

				Net Returns (%)								Excess Returns (basis points)							
								Annualized								Annualized			
	Style	Inception	Amount ($mil.)	Month	3 Months	YTD	1 Year	3 Years	5 Years	10 Years	ITD	Month	3 Months	YTD	1 Year	3 Years	5 Years	10 years	ITD
SHENKMAN CAPITAL MANAGEMENT	FUNDAMENTAL	10/01/2009	74	0.76	1.79	4.26	7.54	7.19	---	---	9.57	-16	0	-32	-36	-164	---	---	-205
Barclays Corp High Yield				0.92	1.80	4.59	7.90	8.83	---	---	---								
TOTAL HIGH YIELD FIXED INCOME			$ 1,146																
EMERGING MARKETS DEBT																			
ASHMORE EMERGING MKT DBT BLEND	FUNDAMENTAL	01/01/2013	564	2.83	5.52	5.11	-0.02	---	---	---	-0.81	41	27	-84	-190	---	---	---	-44
EMERGING MARKETS BLENDED INDEX				2.42	5.25	5.95	1.88	---	---	---	---								
PIMCO EMERGING MARKET DEBT LC	FUNDAMENTAL	01/01/2013	349	2.20	6.36	5.91	-1.62	---	---	---	-3.88	12	47	96	-25	---	---	---	-69
JPM GBI-EM Global Diversified Index				2.08	5.88	4.94	-1.37	---	---	---	---								
TOTAL EMERGING MARKETS DEBT			$ 912																
TOTAL PUBLIC FIXED INCOME			$ 4,771																
GTAA																			
BRIDGEWATER ASSOCIATES GLBL TAA	FUNDAMENTAL	01/01/2004	3,158	2.23	3.64	5.83	16.64	12.02	17.06	9.76	9.41	61	82	135	255	217	394	280	261
GTAA CUSTOM BENCHMARK				1.62	2.82	4.48	14.09	9.84	13.12	6.96	---								
WINDHAM	QUANTITATIVE	10/01/2011	601	1.79	3.00	4.13	11.49	---	---	---	12.75	8	-11	-118	-235	---	---	---	-367
WINDHAM CUSTOM INDEX				1.71	3.11	5.31	13.84	---	---	---	---								
TOTAL GTAA			$ 3,759																
GLOBAL INFLATION LINKED																			
GRESHAM	FUNDAMENTAL	09/01/2010	850	-1.51	0.75	5.53	3.85	-4.68	---	---	3.40	137	85	-92	135	229	---	---	272
DJ-UBS Commodity Index TR				-2.87	-0.10	6.45	2.50	-6.97	---	---	---								
TOTAL GLOBAL INFLATION LINKED			$ 850																
TOTAL PUBLIC MARKET			$ 27,889																

STATE STREET.

ARIZONA STATE RETIREMENT SYSTEM
Investment Management Division

ASRS Long Term Disability Assets
Investment Managers Performance Summary

Period Ending May 31, 2014
FINAL

			Net Returns (%)								Excess Returns (basis points)							
							Annualized								Annualized			
	Inception	Amount ($mil.)	Month	3 Months	YTD	1 Year	3 Years	5 Years	10 Years	ITD	Month	3 Months	YTD	1 Year	3 Years	5 Years	10 years	ITD
BLACKROCK - US DEBT FUND B	01/01/2011	31.5	1.15	1.80	3.94	2.62	3.56	---	---	4.03	1	-1	7	-8	2	---	---	2
Barclays Aggregate			1.14	1.82	3.87	2.71	3.55	4.96	4.99	---								
BLACKROCK - US HIGH YIELD FUND B	01/01/2011	18.2	0.89	1.70	4.59	7.71	8.40	---	---	9.21	-3	-10	0	-19	-42	---	---	-36
Barclays Corp High Yield			0.92	1.80	4.59	7.90	8.83	14.43	9.11	---								
BLACKROCK-LTD-EM BD INDX FD B	01/01/2013	10.1	2.03	5.80	4.79	-2.05	---	---	---	-4.05	-5	-8	-16	-68	---	---	---	-86
JPM GBI-EM Global Diversified Index			2.08	5.88	4.94	-1.37	0.97	7.47	10.01	---								
BLACKROCK - RUSSELL 1000 FUND B	01/01/2011	99.8	2.29	3.42	4.85	20.84	15.08	---	---	15.81	-1	-2	-3	-5	0	---	---	1
RUSSELL 1000			2.30	3.43	4.88	20.90	15.08	18.77	8.14	---								
BLACKROCK - RUSSELL 2000 FUND B	01/01/2011	18.6	0.79	-3.75	-2.00	16.95	11.88	---	---	13.13	-1	2	3	15	15	---	---	16
RUSSELL 2000			0.80	-3.77	-2.02	16.79	11.73	19.32	8.59	---								
BLACKROCK - EAFE INDEX FUND B	01/01/2011	39.2	1.66	2.51	3.84	18.07	7.37	---	---	8.41	4	8	6	-9	-31	---	---	-34
MSCI EAFE NET			1.62	2.44	3.78	18.16	7.68	11.85	---	---								
BLACKROCK EAFE SMALL CAP FUND B	01/01/2011	9.5	1.44	0.12	3.95	22.54	8.68	---	---	9.35	4	6	-1	-13	-29	---	---	-29
MSCI EAFE SMALL CAP NET			1.40	0.05	3.96	22.67	8.97	15.63	---	---								
BLACKROCK MSCI EMERGING MARKETS FUND B	01/01/2011	16.0	3.47	6.99	3.16	4.01	-2.01	---	---	-1.09	-2	-3	-23	-47	-53	---	---	-52
MSCI EMF NET			3.49	7.02	3.39	4.48	-1.48	---	---	---								
BGI-LTD- R ESTATE FD	01/01/2005	22.2	2.42	7.10	17.05	10.13	9.49	22.51	---	7.05	-11	-3	31	-57	-115	-95	---	-48
WILSHIRE RESI			2.53	7.14	16.75	10.70	10.64	23.45	9.91	---								
BLACKROCK DJ UBS COMM FUND B	01/01/2011	7.3	-2.95	-0.18	6.26	2.16	-7.36	---	---	-5.79	-8	-8	-19	-34	-38	---	---	-35
DJ-UBS Commodity Index TR			-2.87	-0.10	6.45	2.50	-6.97	1.47	0.39	---								
LONG TERM DISABILITY - CASH	07/01/1995	3.0	0.00	0.00	0.00	0.00	0.02	0.11	1.74	2.81	0	-1	-2	-6	-5	0	9	-5
91 DAY TREASURY BILL			0.00	0.01	0.02	0.06	0.08	0.11	1.65	---								
TOTAL LTD		$ 275.5																

STATE STREET.

Long Term Disability (LTD)

Friday, May 30, 2014

Account Manager	Account Manager Style	Fixed Income	Equity	Inflation Linked	Total	Pct of Fund	Target (Range)
StateStreet B&T: Boston	Cash	$3,035,486			$3,035,486	1.10%	
BlackRock: San Francisco	Fixed Core (Passive)	$31,524,754			$31,524,754	11.44%	13%
BlackRock: San Francisco	Fixed High Yield (Passive)	$18,192,065			$18,192,065	6.60%	8%
BlackRock: San Francisco	Emerging Market Debt (Passive)	$10,125,819			$10,125,819	3.68%	4%
						21.72%	**25% (15-35%)**
BlackRock: San Francisco	Russell 1000 (Passive)		$99,823,433		$99,823,433	36.24%	34%
BlackRock: San Francisco	Russell 2000 (Passive)		$18,621,534		$18,621,534	6.76%	6%
						43.00%	**40% (33-45%)**
BlackRock: San Francisco	EAFE (Passive)		$39,246,624		$39,246,624	14.25%	14%
BlackRock: San Francisco	EAFE SC (Passive)		$9,471,936		$9,471,936	3.44%	3%
BlackRock: San Francisco	Emerging Markets (Passive)		$15,977,726		$15,977,726	5.80%	6%
						23.49%	**23% (16-28%)**
BlackRock: San Francisco	Dow Jones UBS Commodities (Passive)			$7,267,563	$7,267,563	2.64%	4% (1-7%)
BlackRock: San Francisco	US Real Estate (Passive)			$22,185,035	$22,185,035	8.05%	8% (6-10%)
						10.69%	**12% (8-16%)**
	TOTAL Amounts	$62,878,124	$183,141,253	$29,452,598	**$275,471,975**		
	TOTAL Percent	22.83%	66.48%	10.69%			
	Actual Portfolio	**22.83%**	**66.48%**	**10.69%**			
	Policy	**25% (15-35%)**	**63% (53-70%)**	**12% (8-16%)**			

STATE STREET GLOBAL SERVICES

STATE STREET INVESTMENT ANALYTICS

Executive Presentation

To: Arizona State Retirement System

truView Risk Report April 30, 2014

Produced by State Street Investment Analytics, Risk Services

Monthly Reallocation Summary*

Month Ending April 30, 2014

Portfolio Reductions

- TOTAL US EQUITY
  - $10M – INTECH US Large Cap)
  - $15M – LSV (US Large Cap)
  - $20M – WELLINGTON (US Mid Cap)
  - $15M – CHAMPLAIN (US Small Cap)
  - $40M – DFA (US Small Cap)
  - $40M – TIMESSQUARE (US Small Cap)
- TOTAL OPPORTUNISTIC
  - $52M – GUGGENHEIM PARTNERS
- TOTAL FIXED INCOME
  - $150M – PIMCO (Core)
- TOTAL MASTER CASH
  - $108M – MASTER CASH
- **TOTAL REDUCTIONS****
  - **$450M**

Portfolio Additions

- TOTAL FIXED INCOME
  - $450M – BGI US DEBT FUND (Core)
- **TOTAL ADDITIONS****
  - **$450M**

***Based on State Street accounting records for public markets and therefore exclude private market drawdowns.**
****Reductions and additions do not include plan distributions.**

Monthly Reallocation Summary*

Month Ending May 31, 2014

Portfolio Reductions

- TOTAL OPPORTUNISTIC
  - $23M – GUGGENHEIM PARTNERS
- TOTAL FIXED INCOME
  - $150M – PIMCO (Core)
  - $100M – SHENKMAN (High Yield)
- **TOTAL REDUCTIONS****
  - **$273M**

Portfolio Additions

- TOTAL FIXED INCOME
  - $250M – BGI US DEBT FUND (Core)
- TOTAL MASTER CASH
  - $23M – MASTER CASH
- **TOTAL ADDITIONS****
  - **$273M**

***Based on State Street accounting records for public markets and therefore exclude private market drawdowns.**
****Reductions and additions do not include plan distributions.**

Monthly Risk Summary

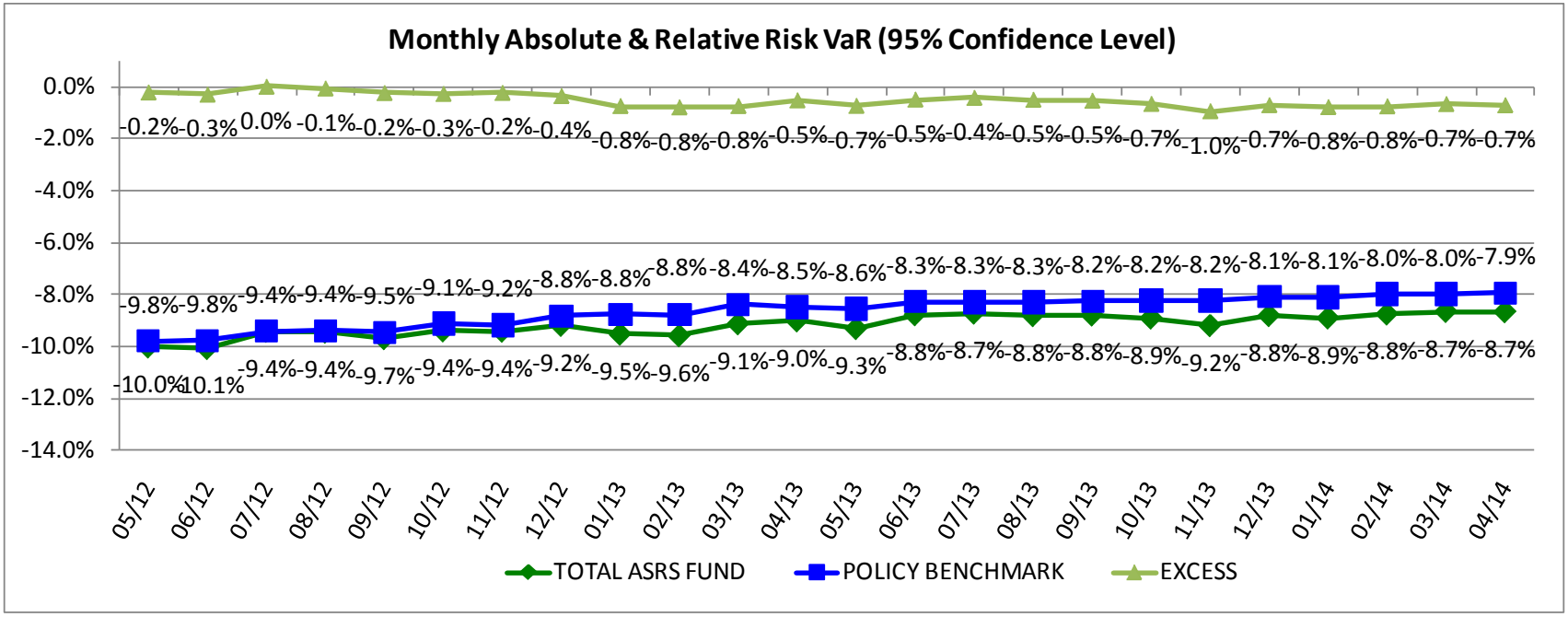
Month Ending April 30, 2014

Month-end Risk Profile

- Historical Risk (95% VaR) for all asset classes remain relatively constant from prior months with no substantial deltas. Total Plan risk decreased a marginal 1bps with corresponding 4bps decrease in the Policy Benchmark. A steady market environment has helped produced a stable risk profile since the beginning of last year.

- Excess risk over the Policy Benchmark is unchanged from the prior month at -0.7%.

.



ARIZONA STATE RETIREMENT SYSTEM

As of April 30, 2014

TOTAL PLAN EXPOSURE OVERVIEW

Sector (Public US Equity Only)		$ Value	% Value	**Blended US BM	Difference
BASIC MATERIALS	$	353,297,538	3.3%	3.3%	(0.0%)
CASH	$	153,978,113	1.4%	0.0%	1.4%
COMMUNICATIONS	$	902,264,269	8.3%	11.5%	(3.2%)
CONSUMER CYCLICAL	$	1,082,055,269	10.0%	9.4%	0.6%
CONSUMER NON-CYCLICAL	$	2,406,948,225	22.2%	21.9%	0.3%
DIVERSIFIED	$	2,237,806	0.0%	0.0%	(0.0%)
ENERGY	$	966,723,510	8.9%	10.6%	(1.7%)
FINANCIAL	$	1,664,236,173	15.4%	16.5%	(1.1%)
FUNDS	$	482,532,300	4.5%	0.0%	4.5%
GOVERNMENT	$	28,118,853	0.3%	0.0%	0.3%
INDEX	$	7,993,952	0.1%	0.0%	0.1%
INDUSTRIAL	$	1,240,725,251	11.5%	10.8%	0.7%
TECHNOLOGY	$	1,168,795,083	10.8%	12.8%	(2.0%)
UTILITIES	$	362,666,664	3.4%	3.2%	0.2%
GRAND TOTAL	**$**	**10,822,573,008**	**100.0%**	**100.0%**	**0.0%**

Country Category (Total Plan)		$ Value	% Value	*Blended TOTAL BM	Difference
AFRICA	$	293,344,732	0.9%	0.9%	0.0%
ASIA DEVELOPED	$	1,835,640,245	5.5%	8.7%	(3.2%)
ASIA EM	$	1,285,377,215	3.9%	4.4%	(0.5%)
EUROPE DEVELOPED	$	3,968,363,723	11.9%	14.6%	(2.7%)
EUROPE EM	$	160,113,218	0.5%	1.0%	(0.5%)
LATIN AMERICA	$	789,124,791	2.4%	3.2%	(0.8%)
MIDDLE EAST	$	127,424,876	0.4%	0.4%	0.0%
NORTH AMERICA	$	24,825,418,092	74.6%	66.9%	7.7%
GRAND TOTAL	**$**	**33,284,806,892**	**100.0%**	**100.0%**	**0.0%**

Market Cap^ (Public Equities Only)		$ Value	% Value	*Blended TOTAL BM	Difference
1) 0 - 100M	$	4,411,035	0.0%	0.0%	0.0%
2) 100M - 500M	$	627,673,261	3.2%	1.3%	1.9%
3) 500M - 1B	$	408,532,197	2.1%	3.6%	(1.5%)
4) 1B - 5B	$	3,333,621,915	17.0%	22.5%	(5.5%)
5) 5B - 10B	$	2,142,204,274	10.9%	10.5%	0.4%
6) 10B - 50B	$	5,599,584,939	28.5%	27.9%	0.6%
7) >50B	$	7,524,359,643	38.3%	34.1%	4.2%
GRAND TOTAL	**$**	**19,640,387,264**	**100.0%**	**100.0%**	**100.0%**

^Excludes cash and non-traded securities

	Top 20 Issuer (Total Plan)		$ Value	% Value	Market Cap	Sector	Industry Group
1	Cash***	$	1,739,325,048	5.2%		CASH	Cash
2	SPDR S&P 500 ETF TRUST	$	1,270,941,852	3.8%	7) 50B+	FUNDS	EQUITY FUND
3	TREASURY BILL	$	770,279,639	2.3%		GOVERNMENT	SOVEREIGN
4	US TREASURY N/B	$	758,762,885	2.3%		GOVERNMENT	SOVEREIGN
5	FANNIE MAE	$	720,596,530	2.2%		MORTGAGE SECURITIES	FNMA COLLATERAL
6	APPLE INC	$	208,837,470	0.6%	7) 50B+	TECHNOLOGY	COMPUTERS
7	EXXON MOBIL CORP	$	193,947,745	0.6%	7) 50B+	ENERGY	OIL&GAS
8	FREDDIE MAC	$	166,025,062	0.5%		MORTGAGE SECURITIES	FGLMC COLLATERAL
9	MICROSOFT CORP	$	141,679,130	0.4%	7) 50B+	TECHNOLOGY	SOFTWARE
10	JOHNSON & JOHNSON	$	137,212,253	0.4%	7) 50B+	CONSUMER NON-CYCLICAL	PHARMACEUTICALS
11	VANGUARD TOTAL STOCK MARKET ET	$	127,067,741	0.4%	6) 10B - 50B	FUNDS	EQUITY FUND
12	CHEVRON CORP	$	123,479,672	0.4%	7) 50B+	ENERGY	OIL&GAS
13	ISHARES MSCI USA VALUE FACTOR ET	$	122,079,800	0.4%	2) 100M - 500M	FUNDS	EQUITY FUND
14	ISHARES MSCI USA QUALITY FACTOR I	$	122,012,500	0.4%	2) 100M - 500M	FUNDS	EQUITY FUND
15	ISHARES MSCI USA MOMENTUM FACTO	$	119,480,000	0.4%	2) 100M - 500M	FUNDS	EQUITY FUND
16	ISHARES MSCI USA SIZE FACTOR ETF	$	118,960,000	0.4%	2) 100M - 500M	FUNDS	EQUITY FUND
17	PFIZER INC	$	117,287,906	0.4%	7) 50B+	CONSUMER NON-CYCLICAL	PHARMACEUTICALS
18	VANGUARD FTSE DEVELOPED MARKET	$	110,107,282	0.3%	6) 10B - 50B	FUNDS	EQUITY FUND
19	AT&T INC	$	103,039,715	0.3%	7) 50B+	COMMUNICATIONS	TELECOMMUNICATIONS
20	PROCTER & GAMBLE CO/THE	$	99,191,537	0.3%	7) 50B+	CONSUMER NON-CYCLICAL	COSMETICS/PERSONAL CARE

***Blended TOTAL BM**: 26% SP500, 5% SP400, 5% SP600, 5% R2000, 14% MSCI EAFE, 6% MSCI EM, 3% MSCI Sml Cap, 17% BC US AGG, 5% BC US HY, 6% FTSE NAREIT GLOBAL, 4% DJ-UBS COMMODITY, 4% JPM EMBI.

****Blended US BM**: 72% SP500, 14% SP400, 14% SP600.

*****Cash** does not represent an IMD tactical view; **Cash** includes the ASRS Master Cash balance, manager- level portfolio cash & equivalents and cash collateralizing sundry portfolio-level futures contracts.

ARIZONA STATE RETIREMENT SYSTEM

As of April 30, 2014

INTERNATIONAL EQUITY EXPOSURE OVERVIEW

Sector (Public Intl Equity Only)		$ Value	% Value	*Blended NON-US BM	Difference
BASIC MATERIALS	$	469,798,398	6.5%	7.7%	(1.2%)
CASH	$	92,105,783	1.3%	0.0%	1.3%
COMMUNICATIONS	$	617,213,577	8.6%	8.3%	0.3%
CONSUMER CYCLICAL	$	833,962,511	11.6%	11.8%	(0.2%)
CONSUMER NON-CYCLICAL	$	1,384,101,849	19.3%	18.5%	0.8%
DIVERSIFIED	$	78,321,845	1.1%	1.1%	(0.0%)
ENERGY	$	508,370,421	7.1%	7.4%	(0.3%)
FINANCIAL	$	1,693,220,687	23.6%	24.9%	(1.3%)
FX	$	17,507	0.0%	0.0%	0.0%
INDEX	$	43,517,450	0.6%	0.0%	0.6%
INDUSTRIAL	$	898,112,125	12.5%	11.9%	0.6%
TECHNOLOGY	$	337,751,389	4.7%	4.9%	(0.2%)
UTILITIES	$	218,762,633	3.0%	3.3%	(0.3%)
GRAND TOTAL	**$**	**7,175,256,173**	**100.0%**	**100.0%**	**0.0%**

Country Category (Public Intl Equity Only)		$ Value	% Value	*Blended NON-US BM	Difference
AFRICA	$	175,584,355	2.4%	2.1%	0.3%
ASIA DEVELOPED	$	1,791,190,524	25.0%	29.2%	(4.3%)
ASIA EMERGING	$	937,570,424	13.1%	13.0%	0.1%
EUROPE DEVELOPED	$	3,478,187,191	48.5%	49.5%	(1.0%)
EUROPE EMERGING	$	81,199,114	1.1%	0.6%	0.5%
LATIN AMERICA	$	410,958,093	5.7%	5.0%	0.7%
MIDDLE EAST	$	95,959,870	1.3%	0.5%	0.9%
NORTH AMERICA	$	204,606,602	2.9%	0.1%	2.8%
GRAND TOTAL	**$**	**7,175,256,173**	**100.0%**	**100.0%**	**0.0%**

	Top 20 Industry Groups (Public Intl Only		$ Value	% Value	*Blended NON-US BM	Difference
1	BANKS	$	879,292,822	12.3%	13.7%	(1.5%)
2	OIL&GAS	$	446,551,359	6.2%	6.6%	(0.4%)
3	PHARMACEUTICALS	$	443,240,278	6.2%	6.2%	(0.0%)
4	TELECOMMUNICATIONS	$	433,596,811	6.0%	5.6%	0.4%
5	INSURANCE	$	399,201,338	5.6%	4.6%	0.9%
6	FOOD	$	365,051,164	5.1%	4.7%	0.4%
7	RETAIL	$	252,056,697	3.5%	3.2%	0.3%
8	CHEMICALS	$	210,195,769	2.9%	3.4%	(0.4%)
9	AUTO MANUFACTURERS	$	206,238,788	2.9%	3.2%	(0.3%)
10	SEMICONDUCTORS	$	183,979,762	2.6%	2.8%	(0.2%)
11	COMMERCIAL SERVICES	$	173,027,687	2.4%	1.8%	0.6%
12	MINING	$	158,519,601	2.2%	2.7%	(0.5%)
13	DIVERSIFIED FINAN SERV	$	150,376,535	2.1%	2.5%	(0.4%)
14	ELECTRIC	$	146,543,418	2.0%	2.2%	(0.2%)
15	REAL ESTATE	$	146,420,222	2.0%	2.0%	0.1%
16	BEVERAGES	$	135,369,530	1.9%	2.1%	(0.2%)
17	ENGINEERING&CONSTRUCTIC	$	134,393,926	1.9%	1.8%	0.1%
18	TRANSPORTATION	$	119,167,603	1.7%	1.5%	0.2%
19	MACHINERY-DIVERSIFIED	$	106,663,542	1.5%	1.1%	0.4%
20	AGRICULTURE	$	106,585,253	1.5%	1.3%	0.2%

Market Cap** (Public Intl Equities Only)		$ Value	% Value	*Blended NON-US BM	Difference
1) 0 - 100M	$	3,652,458	0.1%	0.0%	0.0%
2) 100M - 500M	$	111,663,213	1.6%	0.8%	0.8%
3) 500M - 1B	$	245,616,933	3.5%	1.9%	1.5%
4) 1B - 5B	$	1,323,593,852	18.8%	15.4%	3.4%
5) 5B - 10B	$	860,158,793	12.2%	12.2%	0.0%
6) 10B - 50B	$	2,372,786,220	33.8%	35.1%	(1.4%)
7) >50B	$	2,112,719,096	30.1%	34.5%	(4.4%)
GRAND TOTAL	**$**	**7,030,190,566**	**100.0%**	**100.0%**	**100.0%**

**Excludes cash and non-traded securities

***Blended NON-US BM**: 61% MSCI EAFE, 26% MSCI EM, 13% MSCI Sml Cap.

ARIZONA STATE RETIREMENT SYSTEM

As of April 30, 2014

TOTAL FIXED INCOME EXPOSURE OVERVIEW

Sector (Public Fixed Income Only)		$ Value	% Value	*Blended FI BM	Difference
ASSET BACKED SECURITIES	$	7,982,793	0.2%	0.3%	(0.2%)
BASIC MATERIALS	$	66,958,054	1.4%	2.4%	(1.0%)
CASH	$	102,398,115	2.2%	0.0%	2.2%
COMMUNICATIONS	$	344,106,162	7.3%	5.5%	1.8%
CONSUMER CYCLICAL	$	215,730,799	4.6%	3.6%	0.9%
CONSUMER NON-CYCLICAL	$	306,966,695	6.5%	5.4%	1.1%
DIVERSIFIED	$	5,825,046	0.1%	0.2%	(0.1%)
ENERGY	$	260,248,049	5.5%	6.6%	(1.1%)
FINANCIAL	$	336,041,568	7.1%	8.6%	(1.5%)
FIXED INCOME	$	188,932	0.0%	0.0%	0.0%
FUNDS	$	9,189,408	0.2%	0.0%	0.2%
FX	$	1,475,954	0.0%	0.0%	0.0%
GOVERNMENT	$	1,542,679,544	32.5%	40.8%	(8.3%)
INDEX	$	560,825,451	11.8%	0.0%	11.8%
INDUSTRIAL	$	154,407,802	3.3%	3.1%	0.1%
LOAN	$	20,207,010	0.4%	0.0%	0.4%
MORTGAGE SECURITIES	$	644,513,008	13.6%	19.9%	(6.3%)
SWAP	$	(136,322)	(0.0%)	0.0%	(0.0%)
TECHNOLOGY	$	85,727,367	1.8%	1.4%	0.4%
UTILITIES	$	74,747,864	1.6%	2.1%	(0.5%)
GRAND TOTAL	**$**	**4,740,083,299**	**100.0%**	**100.0%**	**0.0%**

	Top 20 Industry Groups (Public Fixed Income Only)		$ Value	% Value	*Blended FI BM	Difference
1	SOVEREIGN	$	1,486,206,159	31.4%	38.8%	(7.5%)
2	FNMA COLLATERAL	$	496,441,246	10.5%	8.7%	1.8%
3	TELECOMMUNICATIONS	$	194,756,917	4.1%	3.2%	0.9%
4	OIL&GAS	$	185,261,746	3.9%	4.8%	(0.9%)
5	MEDIA	$	124,329,124	2.6%	2.0%	0.6%
6	BANKS	$	120,899,756	2.6%	4.8%	(2.3%)
7	DIVERSIFIED FINAN SERV	$	119,401,843	2.5%	2.3%	0.2%
8	Cash	$	102,398,115	2.2%	0.0%	2.2%
9	HEALTHCARE-SERVICES	$	76,417,888	1.6%	1.1%	0.5%
10	RETAIL	$	74,604,286	1.6%	1.3%	0.3%
11	ELECTRIC	$	73,377,492	1.5%	2.0%	(0.4%)
12	COMMERCIAL SERVICES	$	71,524,745	1.5%	0.9%	0.6%
13	FGLMC COLLATERAL	$	70,945,397	1.5%	5.1%	(3.6%)
14	COMMERCIAL MBS	$	64,142,754	1.4%	1.1%	0.2%
15	SOFTWARE	$	53,270,446	1.1%	0.7%	0.5%
16	PIPELINES	$	48,598,788	1.0%	1.1%	(0.1%)
17	PHARMACEUTICALS	$	45,805,455	1.0%	1.0%	(0.0%)
18	INSURANCE	$	40,099,111	0.8%	0.8%	0.1%
19	MUNICIPAL	$	39,296,630	0.8%	0.6%	0.2%
20	CHEMICALS	$	37,829,944	0.8%	0.7%	0.1%

Credit Rating Group** (Public Fixed Income Only)		$ Value	% Value	*Blended FI BM	Difference
01) AAA	$	1,605,427,417	33.9%	47.2%	(13.4%)
02) AA	$	123,846,934	2.6%	3.6%	(1.0%)
03) A	$	1,063,139,016	22.4%	9.4%	13.0%
04) BBB	$	563,922,400	11.9%	15.1%	(3.2%)
05) BB	$	554,516,801	11.7%	11.9%	(0.2%)
06) B	$	525,631,111	11.1%	9.0%	2.1%
07) CCC	$	195,153,705	4.1%	3.1%	1.0%
08) CC	$	-	0.0%	0.0%	(0.0%)
09) C	$	90,391	0.0%	0.1%	(0.1%)
10) D	$	-	0.0%	0.0%	0.0%
11) Not Rated	$	108,355,523	2.3%	0.6%	1.7%
GRAND TOTAL	**$**	**4,740,083,299**	**100.0%**	**100.0%**	**0.0%**

Maturity Bucket (Public Fixed Income Only)		$ Value	% Value	*Blended FI BM	Difference
0-1Y	$	349,082,586	8.4%	0.3%	8.0%
1Y-3Y	$	406,581,975	9.7%	18.2%	(8.5%)
3Y-5Y	$	667,399,611	16.0%	16.8%	(0.8%)
5Y-10Y	$	1,725,642,515	41.4%	30.6%	10.7%
10Y-15Y	$	155,894,428	3.7%	5.9%	(2.2%)
15Y+	$	866,922,451	20.8%	28.1%	(7.4%)
GRAND TOTAL	**$**	**4,171,523,567**	**100.0%**	**100.0%**	**100.0%**

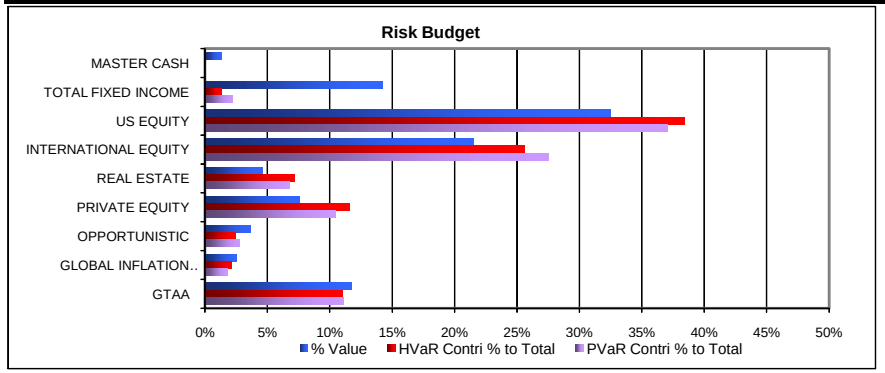
***Blended TOTAL BM**: 66% BC US AGG, 19% BC US HY, 15% JPM EMBI.

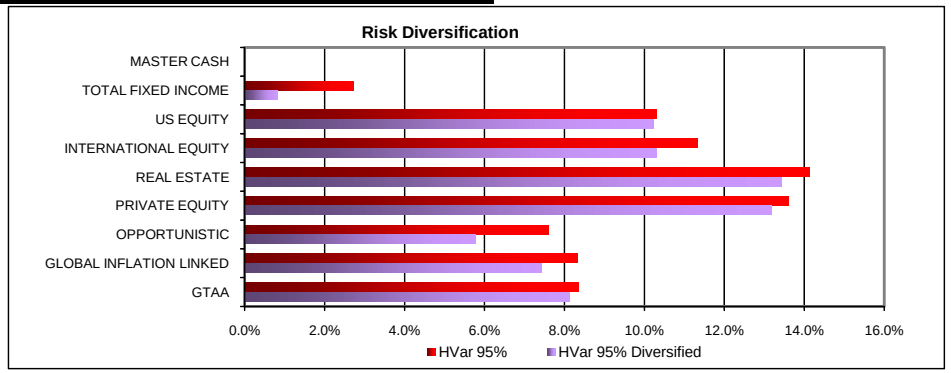
ARIZONA STATE RETIREMENT SYSTEM
As of April 30, 2014

TOTAL PLAN RISK OVERVIEW

Strategy	$ Value	% Value	Historical VaR 95%	HVaR Contri 95%	HVaR Contri % to Total	Parametric VaR 95%	PVaR Contri 95%	PVaR Contri % to Total	Exp Tail Loss 95%	Exp Tail Loss Contri 95%	Exp Tail Loss Contri % to Total	Max Loss	Std Dev	Downside Risk (8%)	Downside Risk Contri (8%)	Downside Risk Contri (8%) to Total
MONTHLY RISK																
MASTER CASH	$ 455,478,123	1%	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%	(0.6%)	(0.0%)	0.0%
TOTAL FIXED INCOME	$ 4,740,083,299	14%	(2.7%)	(0.1%)	1.4%	(2.3%)	(0.2%)	2.2%	(4.1%)	(0.3%)	2.1%	(6.1%)	1.4%	(1.5%)	(0.1%)	2.4%
US EQUITY	$ 10,822,573,008	33%	(10.3%)	(3.3%)	38.5%	(9.2%)	(2.9%)	37.1%	(16.5%)	(5.2%)	37.8%	(30.6%)	6.4%	(4.7%)	(1.5%)	37.0%
INTERNATIONAL EQUITY	$ 7,175,256,173	22%	(11.3%)	(2.2%)	25.7%	(10.5%)	(2.2%)	27.5%	(17.1%)	(3.6%)	26.2%	(37.0%)	7.1%	(5.1%)	(1.1%)	26.8%
REAL ESTATE	$ 1,546,582,910	5%	(14.1%)	(0.6%)	7.2%	(12.3%)	(0.5%)	6.8%	(21.7%)	(0.9%)	6.7%	(39.5%)	8.0%	(6.1%)	(0.3%)	6.7%
PRIVATE EQUITY	$ 2,535,393,015	8%	(13.6%)	(1.0%)	11.6%	(11.5%)	(0.8%)	10.5%	(20.1%)	(1.5%)	10.8%	(36.3%)	7.5%	(5.8%)	(0.4%)	10.6%
OPPORTUNISTIC	$ 1,234,572,333	4%	(7.6%)	(0.2%)	2.5%	(6.6%)	(0.2%)	2.8%	(13.0%)	(0.5%)	3.3%	(25.7%)	4.5%	(3.6%)	(0.1%)	3.0%
GLOBAL INFLATION LINKEI	$ 852,254,024	3%	(8.4%)	(0.2%)	2.2%	(8.1%)	(0.1%)	1.8%	(13.2%)	(0.3%)	2.0%	(26.7%)	5.2%	(4.1%)	(0.1%)	2.0%
GTAA	$ 3,922,614,008	12%	(8.4%)	(1.0%)	11.1%	(7.6%)	(0.9%)	11.2%	(13.4%)	(1.5%)	11.2%	(28.7%)	4.9%	(4.0%)	(0.5%)	11.5%
GRAND TOTAL	**$ 33,284,806,892**	**100%**	**(8.7%)**	**(8.7%)**	**100.0%**	**(7.9%)**	**(7.9%)**	**100.0%**	**(13.9%)**	**(13.9%)**	**100.0%**	**(28.4%)**	**5.3%**	**(4.0%)**	**(4.0%)**	**100.0%**
INTERIM POLICY BENCHMARK			***(7.9%)***			***(7.4%)***			***(12.7%)***			***(25.8%)***	**6.6%**	***(3.7%)***		
ANNUALIZED RISK																
MASTER CASH	$ 455,478,123	1%	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%	N/A	0.0%	(2.2%)	(0.0%)	0.0%
TOTAL FIXED INCOME	$ 4,740,083,299	14%	(9.4%)	(0.4%)	1.4%	(8.1%)	(0.6%)	2.2%	(14.3%)	(1.0%)	2.1%	N/A	4.9%	(5.1%)	(0.3%)	2.4%
US EQUITY	$ 10,822,573,008	33%	(35.8%)	(11.5%)	38.5%	(31.9%)	(10.1%)	37.1%	(57.3%)	(18.1%)	37.8%	N/A	22.1%	(16.1%)	(5.2%)	37.0%
INTERNATIONAL EQUITY	$ 7,175,256,173	22%	(39.3%)	(7.7%)	25.7%	(36.3%)	(7.5%)	27.5%	(59.2%)	(12.6%)	26.2%	N/A	24.4%	(17.6%)	(3.7%)	26.8%
REAL ESTATE	$ 1,546,582,910	5%	(49.0%)	(2.2%)	7.2%	(42.8%)	(1.9%)	6.8%	(75.1%)	(3.2%)	6.7%	N/A	27.7%	(21.0%)	(0.9%)	6.7%
PRIVATE EQUITY	$ 2,535,393,015	8%	(47.1%)	(3.5%)	11.6%	(39.8%)	(2.9%)	10.5%	(69.8%)	(5.2%)	10.8%	N/A	26.1%	(19.9%)	(1.5%)	10.6%
OPPORTUNISTIC	$ 1,234,572,333	4%	(26.4%)	(0.7%)	2.5%	(22.8%)	(0.8%)	2.8%	(45.1%)	(1.6%)	3.3%	N/A	15.7%	(12.5%)	(0.4%)	3.0%
GLOBAL INFLATION LINKEI	$ 852,254,024	3%	(28.9%)	(0.7%)	2.2%	(28.0%)	(0.5%)	1.8%	(45.9%)	(0.9%)	2.0%	N/A	17.9%	(14.2%)	(0.3%)	2.0%
GTAA	$ 3,922,614,008	12%	(29.0%)	(3.3%)	11.1%	(26.3%)	(3.1%)	11.2%	(46.4%)	(5.4%)	11.2%	N/A	17.1%	(13.8%)	(1.6%)	11.5%
GRAND TOTAL	**$ 33,284,806,892**	**100%**	**(30.0%)**	**(30.0%)**	**100.0%**	**(27.4%)**	**(27.4%)**	**100.0%**	**(48.0%)**	**(48.0%)**	**100.0%**	**N/A**	**18.5%**	**(14.0%)**	**(14.0%)**	**100.0%**
INTERIM POLICY BENCHMARK			***(27.5%)***			***(25.5%)***			***(43.9%)***			**N/A**	***23.0%***	***(12.9%)***		

Strategy	$ Value	% Value	Beta SP500	Corr SP500	Beta MSCI EAFE	Corr MSCI EAFE	Duration	Convexity	Notional Exposure	Gross Exposure	Gross Leverage
MASTER CASH	$ 455,478,123	1%	0.00		0.00				$ 455,478,123	$ 455,478,123	100.0%
TOTAL FIXED INCOME	$ 4,740,083,299	14%	0.22	0.73	0.20	0.78	4.76	0.108	$ 4,461,471,680	$ 5,469,727,424	115.4%
US EQUITY	$ 10,822,573,008	33%	1.08	0.99	0.83	0.91	0.54	0.003	$ 10,963,033,752	$ 10,824,143,407	100.0%
INTERNATIONAL EQUITY	$ 7,175,256,173	22%	1.10	0.90	1.01	0.98	0.01	0.000	$ 7,176,174,572	$ 7,219,052,776	100.6%
REAL ESTATE	$ 1,546,582,910	5%	1.23	0.89	1.05	0.90			$ 1,546,582,910	$ 1,546,582,910	100.0%
PRIVATE EQUITY	$ 2,535,393,015	8%	1.25	0.96	0.95	0.86			$ 2,535,393,015	$ 2,535,393,015	100.0%
OPPORTUNISTIC	$ 1,234,572,333	4%	0.70	0.89	0.56	0.85	0.59	0.005	$ 1,236,188,951	$ 1,234,572,333	100.0%
GLOBAL INFLATION LINKEI	$ 852,254,024	3%	0.30	0.67	0.26	0.69	0.33	0.001	$ 1,714,119,734	$ 852,254,024	100.0%
GTAA	$ 3,922,614,008	12%	0.46	0.96	0.39	0.96	5.24	(0.192)	$ 7,585,436,857	$ 7,839,610,885	199.9%
GRAND TOTAL	**$ 33,284,806,892**	**100%**	**0.81**	**0.97**	**0.68**	**0.96**	**4.15**	**0.061**	**$ 37,673,879,593**	**$ 37,976,814,898**	**114.1%**

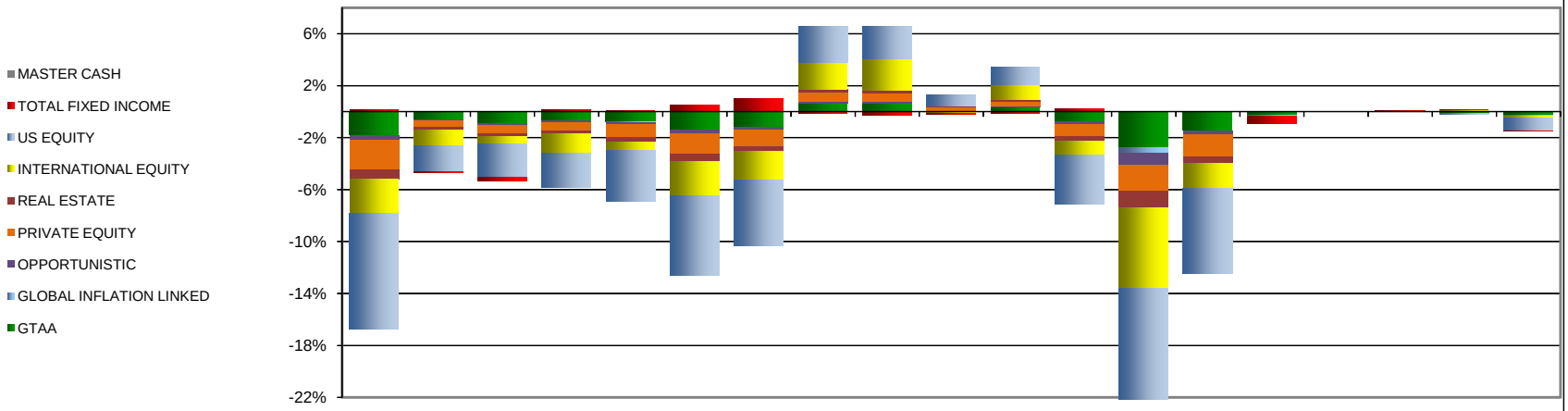




ARIZONA STATE RETIREMENT SYSTEM
As of April 30, 2014

TOTAL PLAN STRESS TESTS

Strategy	$ Value	% Value	Black Monday - 5 Day	Gulf War - 5 Day	Bond Crash: Feb 94 - May 94	Asian Crisis 97-98 - 5 day	Russian Crisis - 5 Day	Nasdaq Correction: July 98 - Aug 98	Russian Debt Crisis Aug-Oct	IR Steepening: Sept 98 - Nov 98	Emerging Markets Rally: Jan 99 - May 99	Fed Tightening: April - June 99	Nasdaq Rally: Nov 99 - Jan 00	9/11 Attack - 5 Day	09-10-2008	S&P 500 -20%	IR Parallel Shift +100bps	Spread Up 10%	Inflation +1%	Gold Shock -20%	Oil Shock -20%
			Historical Scenarios													Predictive Scenarios					
Stress Test Stand Alone																					
MASTER CASH	$ 455,478,123	1.4%	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
TOTAL FIXED INCOME	$ 4,740,083,299	14.2%	1.3	(0.6)	(2.2)	1.2	0.6	3.7	7.0	(1.0)	(2.1)	(0.8)	(1.2)	1.9	(5.6)	0.0	(4.1)	(0.0)	0.4	0.0	(0.0)
US EQUITY	$ 10,822,573,008	32.5%	(27.4)	(6.0)	(7.7)	(8.3)	(12.1)	(19.1)	(15.6)	8.6	7.9	2.8	4.2	(11.7)	(26.7)	(20.2)	0.0	0.0	0.0	(0.1)	(3.2)
INTERNATIONAL EQUITY	$ 7,175,256,173	21.6%	(12.0)	(5.8)	(2.8)	(7.0)	(3.1)	(12.4)	(9.9)	9.6	11.3	(0.5)	5.6	(5.0)	(28.6)	(8.9)	0.0	0.0	(0.0)	0.5	(0.5)
REAL ESTATE	$ 1,546,582,910	4.6%	(15.6)	(3.4)	(4.5)	(4.7)	(6.9)	(11.0)	(8.9)	4.9	4.5	1.6	2.4	(6.7)	(28.2)	(11.5)	0.0	0.0	0.0	0.0	0.0
PRIVATE EQUITY	$ 2,535,393,015	7.6%	(30.2)	(6.7)	(8.6)	(9.1)	(13.4)	(21.3)	(17.2)	9.6	8.7	3.1	4.6	(12.9)	(27.0)	(22.2)	0.0	0.0	0.0	0.0	(0.0)
OPPORTUNISTIC	$ 1,234,572,333	3.7%	(9.8)	(2.2)	(2.8)	(3.0)	(4.3)	(6.9)	(5.5)	3.1	2.8	1.0	1.5	(4.2)	(23.0)	(7.2)	(0.0)	0.0	0.0	0.0	0.0
GLOBAL INFLATION LINKEI	$ 852,254,024	2.6%	(0.0)	0.0	0.0	(0.0)	(0.0)	(0.0)	0.1	(0.0)	0.0	0.0	0.0	(0.0)	(16.9)	0.0	(0.0)	0.0	(0.0)	(5.1)	(4.2)
GTAA	$ 3,922,614,008	11.8%	(15.6)	(5.2)	(7.9)	(5.7)	(6.8)	(12.0)	(9.9)	5.4	5.5	0.5	3.0	(6.7)	(23.5)	(12.5)	(2.6)	0.0	0.3	(0.8)	(2.1)
GRAND TOTAL	**$ 33,284,806,892**	**100.0%**	**(16.5)**	**(4.7)**	**(5.3)**	**(5.7)**	**(6.8)**	**(12.1)**	**(9.3)**	**6.4**	**6.3**	**1.1**	**3.3**	**(6.8)**	**(23.1)**	**(12.5)**	**(0.9)**	**(0.0)**	**0.1**	**(0.1)**	**(1.5)**
INTERIM POLICY BENCHMARK			**(15.1)**	**(4.5)**	**(6.0)**	**(5.6)**	**(6.1)**	**(11.8)**	**(7.8)**	**6.7**	**6.7**	**1.0**	**3.2**	**(6.2)**	**(20.6)**	**(11.4)**	**(1.4)**	**0.0**	**0.2**	**(0.3)**	**(1.9)**
Stress Test Contribution																					
MASTER CASH	$ 455,478,123	1.4%	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
TOTAL FIXED INCOME	$ 4,740,083,299	14.2%	0.2	(0.1)	(0.3)	0.2	0.1	0.5	1.0	(0.1)	(0.3)	(0.1)	(0.2)	0.3	(0.8)	0.0	(0.6)	(0.0)	0.1	0.0	(0.0)
US EQUITY	$ 10,822,573,008	32.5%	(8.9)	(2.0)	(2.5)	(2.7)	(3.9)	(6.2)	(5.1)	2.8	2.6	0.9	1.4	(3.8)	(8.7)	(6.6)	0.0	0.0	0.0	(0.0)	(1.0)
INTERNATIONAL EQUITY	$ 7,175,256,173	21.6%	(2.6)	(1.3)	(0.6)	(1.5)	(0.7)	(2.7)	(2.1)	2.1	2.4	(0.1)	1.2	(1.1)	(6.2)	(1.9)	0.0	0.0	(0.0)	0.1	(0.1)
REAL ESTATE	$ 1,546,582,910	4.6%	(0.7)	(0.2)	(0.2)	(0.2)	(0.3)	(0.5)	(0.4)	0.2	0.2	0.1	0.1	(0.3)	(1.3)	(0.5)	0.0	0.0	0.0	0.0	0.0
PRIVATE EQUITY	$ 2,535,393,015	7.6%	(2.3)	(0.5)	(0.7)	(0.7)	(1.0)	(1.6)	(1.3)	0.7	0.7	0.2	0.3	(1.0)	(2.1)	(1.7)	0.0	0.0	0.0	0.0	(0.0)
OPPORTUNISTIC	$ 1,234,572,333	3.7%	(0.4)	(0.1)	(0.1)	(0.1)	(0.2)	(0.3)	(0.2)	0.1	0.1	0.0	0.1	(0.2)	(0.9)	(0.3)	(0.0)	0.0	0.0	0.0	0.0
GLOBAL INFLATION LINKEI	$ 852,254,024	2.6%	(0.0)	0.0	0.0	(0.0)	(0.0)	(0.0)	0.0	(0.0)	0.0	0.0	0.0	(0.0)	(0.4)	0.0	(0.0)	0.0	(0.0)	(0.1)	(0.1)
GTAA	$ 3,922,614,008	11.8%	(1.8)	(0.6)	(0.9)	(0.7)	(0.8)	(1.4)	(1.2)	0.6	0.6	0.1	0.4	(0.8)	(2.8)	(1.5)	(0.3)	0.0	0.0	(0.1)	(0.3)
GRAND TOTAL	**$ 33,284,806,892**	**100.0%**	**(16.5)**	**(4.7)**	**(5.3)**	**(5.7)**	**(6.8)**	**(12.1)**	**(9.3)**	**6.4**	**6.3**	**1.1**	**3.3**	**(6.8)**	**(23.1)**	**(12.5)**	**(0.9)**	**(0.0)**	**0.1**	**(0.1)**	**(1.5)**
INTERIM POLICY BENCHMARK			**(15.1)**	**(4.5)**	**(6.0)**	**(5.6)**	**(6.1)**	**(11.8)**	**(7.8)**	**6.7**	**6.7**	**1.0**	**3.2**	**(6.2)**	**(20.6)**	**(11.4)**	**(1.4)**	**0.0**	**0.2**	**(0.3)**	**(1.9)**



GLOSSARY	DEFINITION	INTERPRETATION
Historical VaR 95%	A risk metric that is derived from a full revaluation historical simulation of the risk factors impacting a portfolio, making no assumption of the tail distribution, and reporting the largest loss likely to be suffered over a holding period (1Month for ASRS) 5 times out of 100, or 1 month out of 20	Value at Risk is a number, measured in price units or as percentage of portfolio value, which tells you that in a defined large percentage of cases (usually 95% or 99%) your portfolio is likely to not lose more than that amount of money. Or said the other way around, in a defined small percentage of cases (5% or 1%) your loss is expected to be greater than that number.
HVaR Contri 95%	This is the decomposition of the VaR, making it an additive measure, showing positive values where risk is decreased and correlations are negative.	
HVaR Contri % to Total	This is the VaR contribution displayed in percent.	
Parametric VaR 95%	A risk metric that is derived from a full revaluation historical simulation of the risk factors impacting a portfolio, making a Normal distribution assumption of the tail distribution, and reporting the largest loss likely to be suffered over a holding period (1Month for ASRS) 5 times out of 100, or 1 month out of 20.	Value at Risk is a number, measured in price units or as percentage of portfolio value, which tells you that in a defined large percentage of cases (usually 95% or 99%) your portfolio is likely to not lose more than that amount of money. Or said the other way around, in a defined small percentage of cases (5% or 1%) your loss is expected to be greater than that number.
PVaR Contri 95%	This is the decomposition of the VaR, making it an additive measure, showing positive values where risk is decreased and correlations are negative.	
PVaR Contri % to Total	This is the VaR contribution displayed in percent.	
Exp Tail Loss 95%	Also known as Conditional VaR or ETL, it is derived by taking a weighted average between the VaR and losses exceeding the VaR. If VaR is reported at 95.0%, then ETL will average the losses between 95.1% to 99.9%. It is a risk measure that assesses the risk beyond VaR and into the tail end of the distribution of loss.	A measure that produces better incentives for traders than VaR is expected shortfall. This is also sometimes referred to as Conditional VaR, or tail loss. Where VaR asks the question 'how bad can things get?', expected shortfall asks 'if things do get bad, what is our expected loss?
Exp Tail Loss Contri 95%	This is the decomposition of the ETL making it an additive measure, showing positive values where risk is decreased and correlations are negative.	
Exp Tail Loss Contri % to Total	This is the ETL contribution displayed in percent.	
Max Loss	The maximum projected loss.	
Downside Risk (8.7%)	A risk metric that distinguishes between "good" and "bad" returns by assigning risk only to those returns below a return specified by an investor. Downside risk is considered a more effective risk measure than standard deviation (volatility) for two important reasons: 1) it is investor specific, and 2) it identifies return distributions that have higher probabilities for negative ("left tail") market events. Downside risk is also referred to as downside deviation or target semi-deviation.	A 5 % downside risk with an 8.7% MAR means that the conditional average underperformance (below 8.7% annual) is 5%, adjusted for a positive skew (greater than the MAR). Effectively, downside risk amplifies a big loss (by squaring the distance of that loss to the target) and smoothes out the risk measure by taking into account the gains setting them up to be equal to the target MAR.
Downside Risk Contri (8.7%)	This is the decomposition of the downside risk, making it an additive measure, showing positive values where risk is decreased and correlations are negative.	
Downside Risk Contri (8.7%) to Total	This is the downside risk contribution displayed in percent.	

Securities Lending Risk Metrics

	2 – Year Swap Spread (bps)	S&P/ISDA U.S. Financials Select 10 Index	5-Year Financial OAS (bps)	TED Spread (bps)	CBOE VIX Index (vol)	Windham Systemic Risk	Windham Turbulance
5/31/2014	14	54	99	20	11	Low	Low
4/30/2014	12	56	99	20	13	Low	Low
3/31/2014	13	61	103	20	14	Low	Low
2/28/2014	13	60	104	19	14	Low	Low
1/31/2014	13	71	111	22	18	Low	Low
12/31/2013	11	60	109	18	14	Low	Low
11/30/2013	9	68	118	18	14	Low	Low
10/31/2013	12	79	125	21	14	Low	Moderate
9/30/2013	14	90	139	24	17	Low	Moderate
8/31/2013	16	89	142	24	17	Low	High
7/31/2013	17	91	142	23	13	Low	High
6/30/2013	16	106	158	24	17	Low	High
5/31/2013	16	84	134	25	16	Low	Moderate
4/30/2013	14	91	137	23	14	Low	Moderate
3/31/2013	18	101	142	21	13	Low	Low
2/28/2013	15	99	141	18	16	Low	Low
1/31/2013	17	101	146	23	14	Low	Low
12/31/2012	14	116	155	27	18	Low	Low
11/30/2012	12	126	163	23	16	Low	Moderate
10/31/2012	10	130	158	21	19	Low	Moderate
9/30/2012	13	142	179	27	16	Low	Moderate
8/31/2012	18	164	206	35	17	Low	High
7/31/2012	20	179	223	35	19	Low	High
6/30/2012	25	191	253	38	17	Low	Moderate
5/31/2012	35	221	272	40	24	Low	Moderate
4/30/2012	29	179	239	37	17	Low	Moderate
3/31/2012	25	158	227	40	16	Low	Moderate
2/29/2012	26	171	245	41	18	Low	Moderate
1/31/2012	30	186	278	49	19	High	Moderate
12/31/2011	48	248	337	57	23	High	Moderate
11/30/2011	42	263	349	53	28	High	Moderate
10/31/2011	33	219	281	44	30	High	Moderate
9/30/2011	33	268	332	35	43	High	Moderate

0

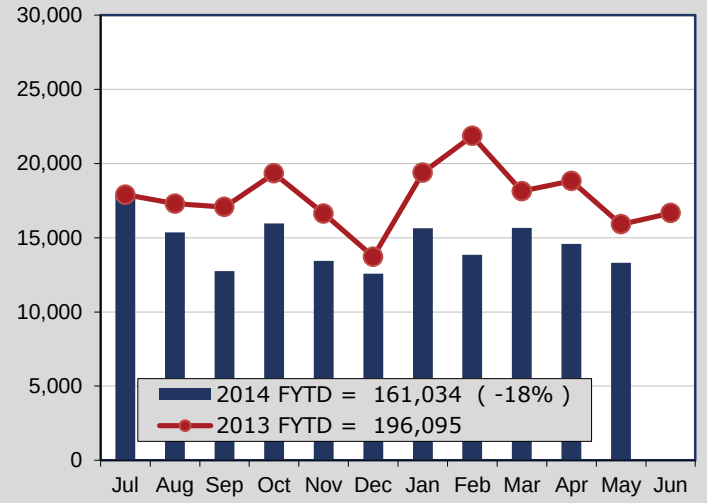
	RISK FACTORS	Green	Yellow	Red
1	2 – Year Swap Spread	< 40 bps	40 - 60 bps	> 60 bps
2	S&P/ISDA US Financial Select 10	< 100 bps	100 - 200 bps	> 200 bps
3	5-Year Financial OAS	< 125 bps	125 - 200 bps	> 200 bps
4	TED Spread	< 50 bps	50 - 100 bps	> 100 bps
5	CBOE VIX Index	< 25 Vol	25 - 35 Vol	> 35 Vol
6	Windham Systemic Risk	Low	n/a	High
7	Windham Turbulence	Low	Moderate	High

LEGEND

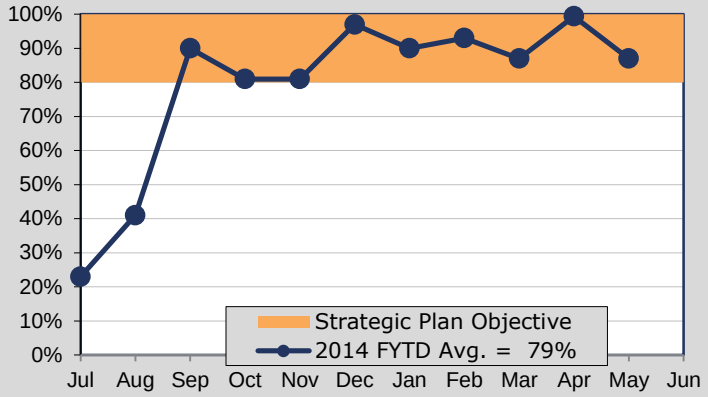
2 – Year Swap Spread	The spread paid by the fixed-rate payer of an interest rate swap over the rate of the 2-year Treasury. The reported 2-year swap spread from Bloomberg is a composite price - calculated average of best bid/ask pricing.
S&P/ISDA US Financial Select 10	The S&P/ISDA US Financial Select 10 tracks major domestic financial 5-year CDS rates. The Index uses and average weighting methodology of the current liquid, "on the run" active contract.
5-Year Financial OAS	The Barclay's U.S. Aggregate Financial Average Option Adjusted Spread; the option adjusted investment grade financial corporate bond spread over 5-year Treasury bonds.
TED Spread	The TED Spread is calculated as the difference between three-month LIBOR expressed in USD and the corresponding yield on 3-month Treasury Bills, expressed in basis points.
CBOE VIX Index	The Chicago Board Options Exchange VIX Index measures the weighted average implied volatility of the S&P 500 using call and put prices over the front two months with a wide range of strike prices.
Windham Systemic Risk	Windham Capital's proprietary measure of the extent to which markets are unified or tightly coupled, called the absorption ratio. When markets are tightly coupled, they are more fragile and negative shocks propagate more quickly and broadly than when markets are loosely linked. Windham reports Systemic Risk as High or Low; there is no Moderate designation for Systemic Risk.
Windham Turbulence	Windham Capital's proprietary measure of the statistical unusualness of a set of returns given their historical pattern of behavior; including extreme price moves, decoupling of correlated assets and convergence of uncorrelated assets. Windham reports Turbulence as High, Moderate, or Low.

Member Advisory Center: Phone

Volume
comparison of calls by month and year



Timeliness
percent answered in 20 seconds or less

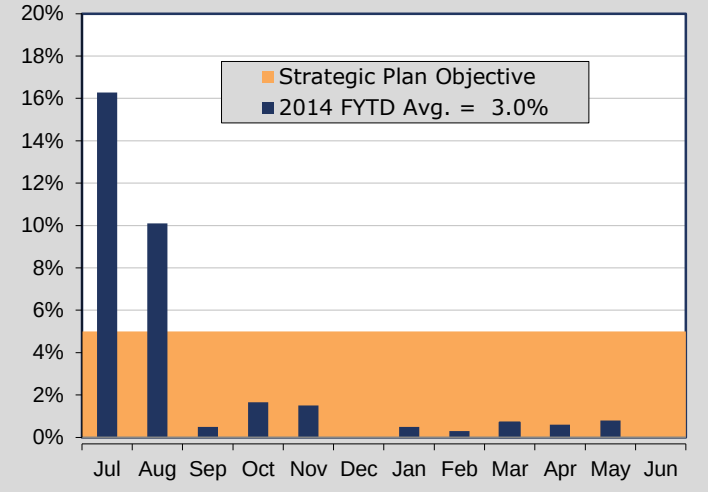


Timeliness (average wait time in seconds)

Jul	Aug	Sep	Oct	Nov	Dec	Jan	Feb	Mar	Apr	May	Jun
261	152	10	24	23	58	55	7	14	12	15	

Resolution Rate
percent answered on first contact

Abandonment Rate
percent of calls abandoned

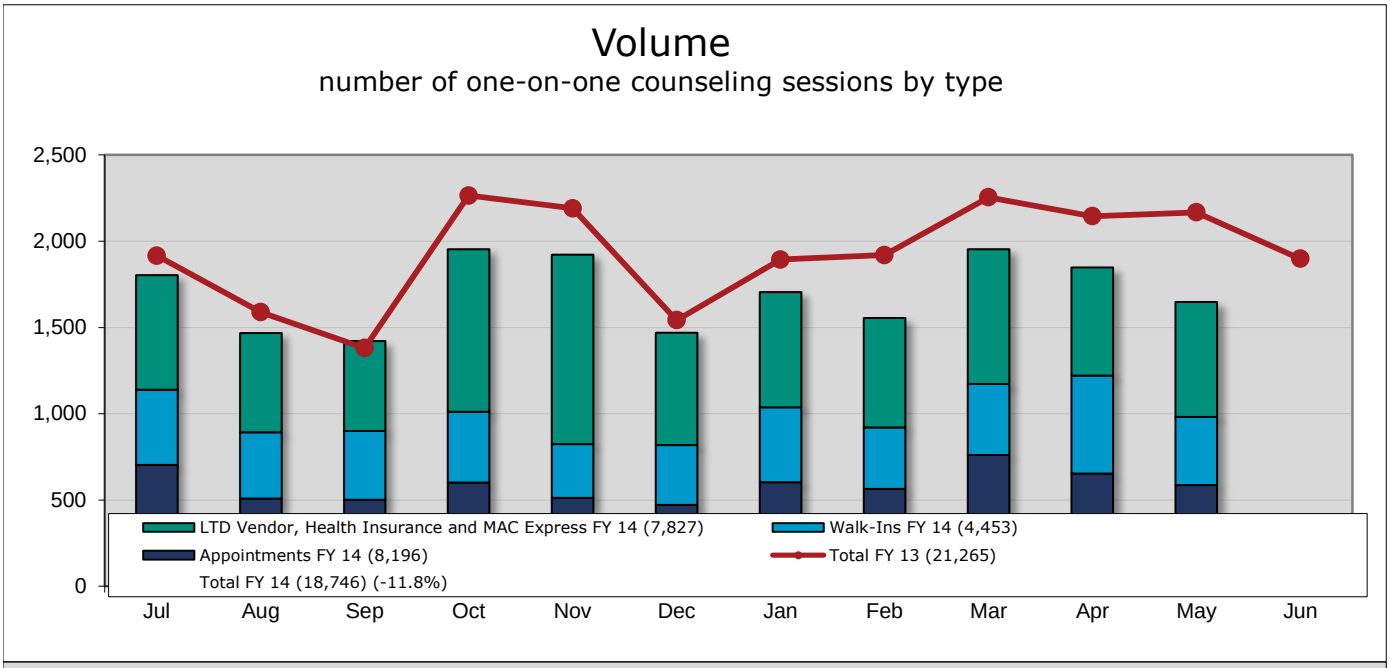


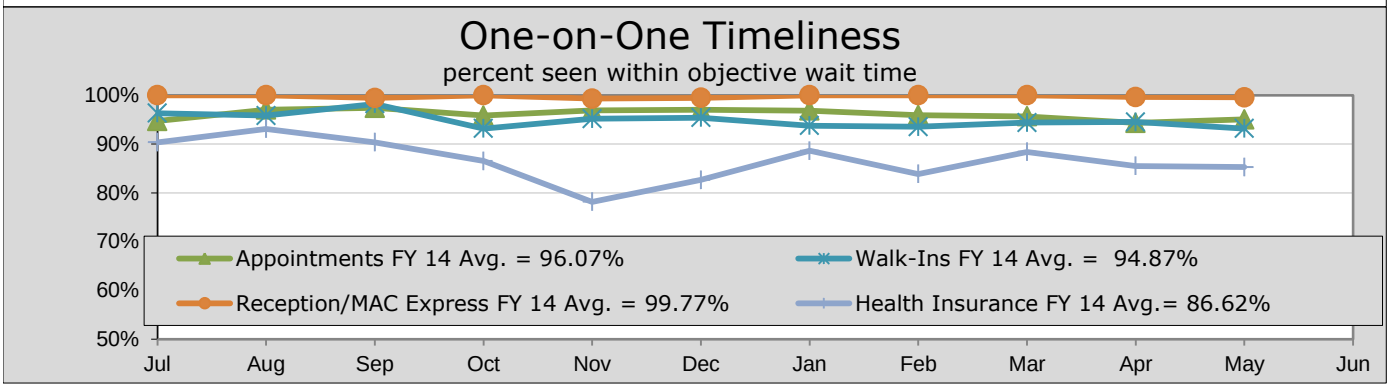
Member Satisfaction
1st Quarter 2014

Data Not Available

Quality
of agent response to member inquiries

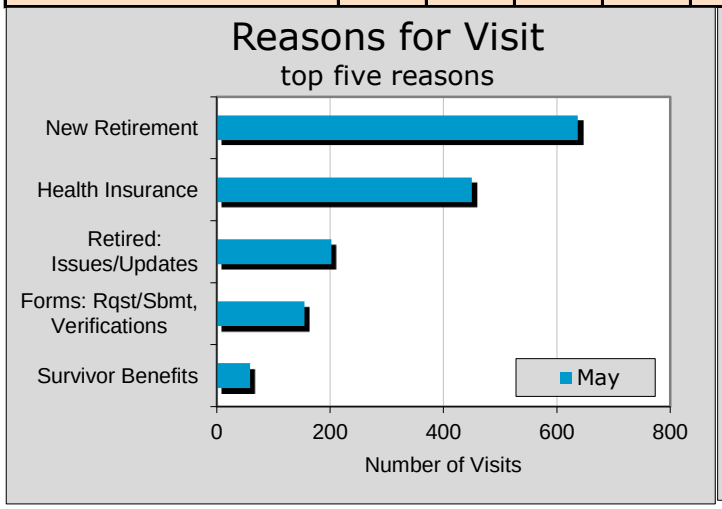
Member Advisory Center: One-on-One

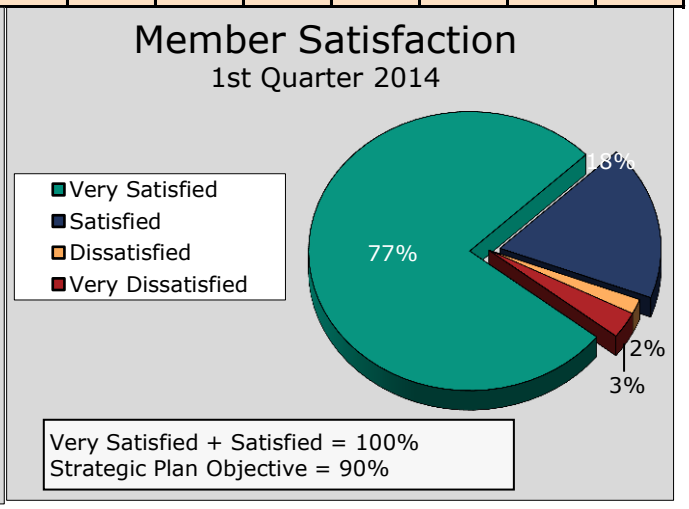




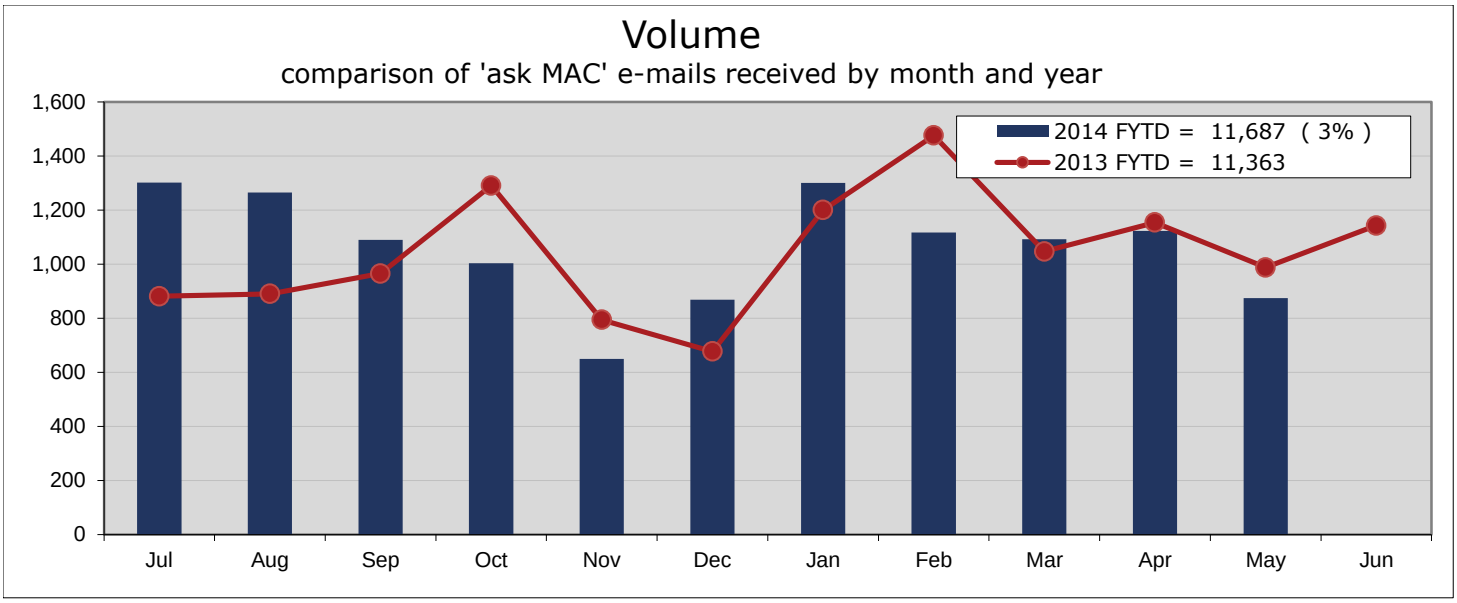
Timeliness (average wait time in minutes)

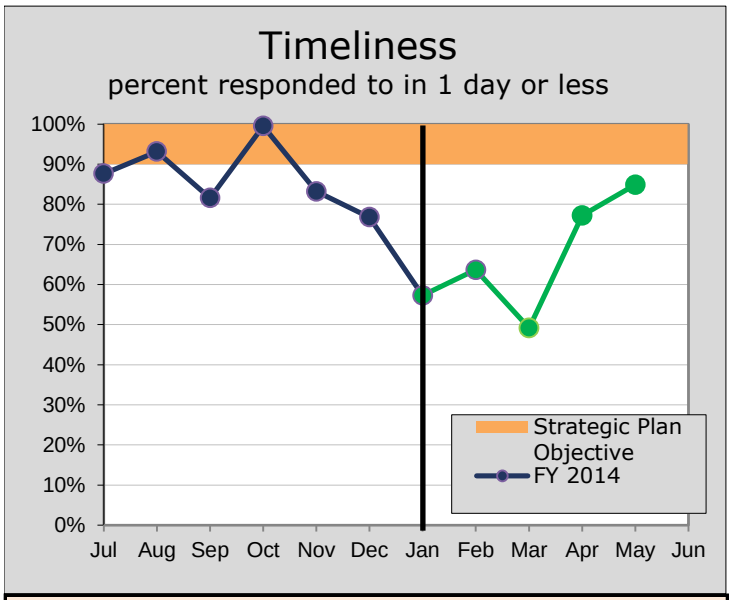
	Jul	Aug	Sep	Oct	Nov	Dec	Jan	Feb	Mar	Apr	May	Jun
Appointments	2	1	1	1	1	1	1	1	1	2	1	
Walk-Ins	7	8	6	8	7	8	9	10	8	7	7	
Reception/Express	0	0	0	1	1	1	0	0	0	0	0	
Health Insurance	6	5	5	7	9	7	6	7	7	7	7	
LTD Vendor	n/a	n/a	n/a	4	4	n/a	n/a	n/a	n/a	0	n/a	

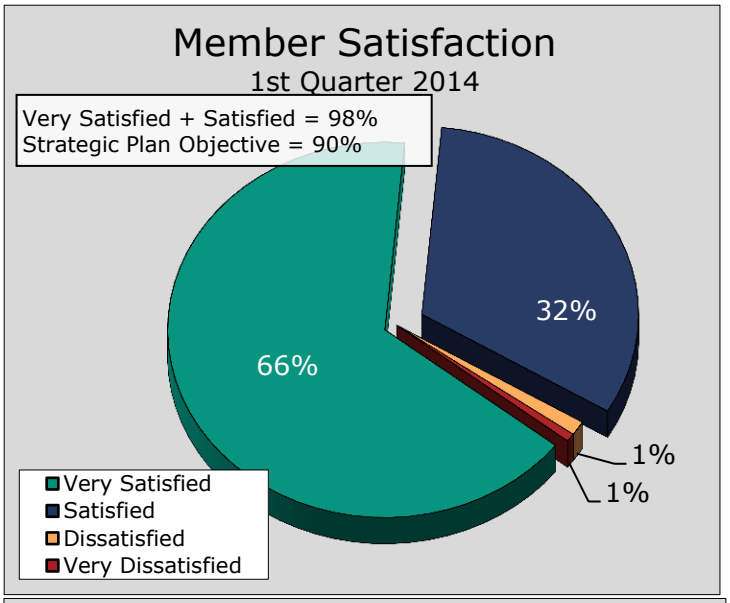




Member Advisory Center: E-Mail



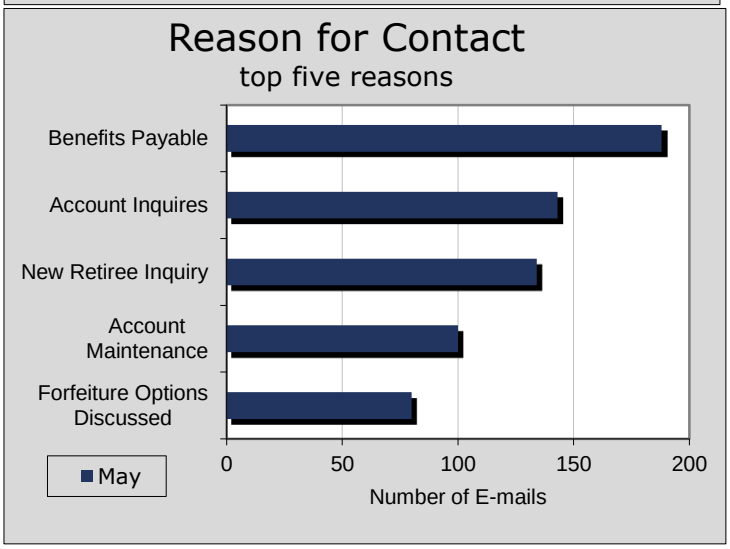




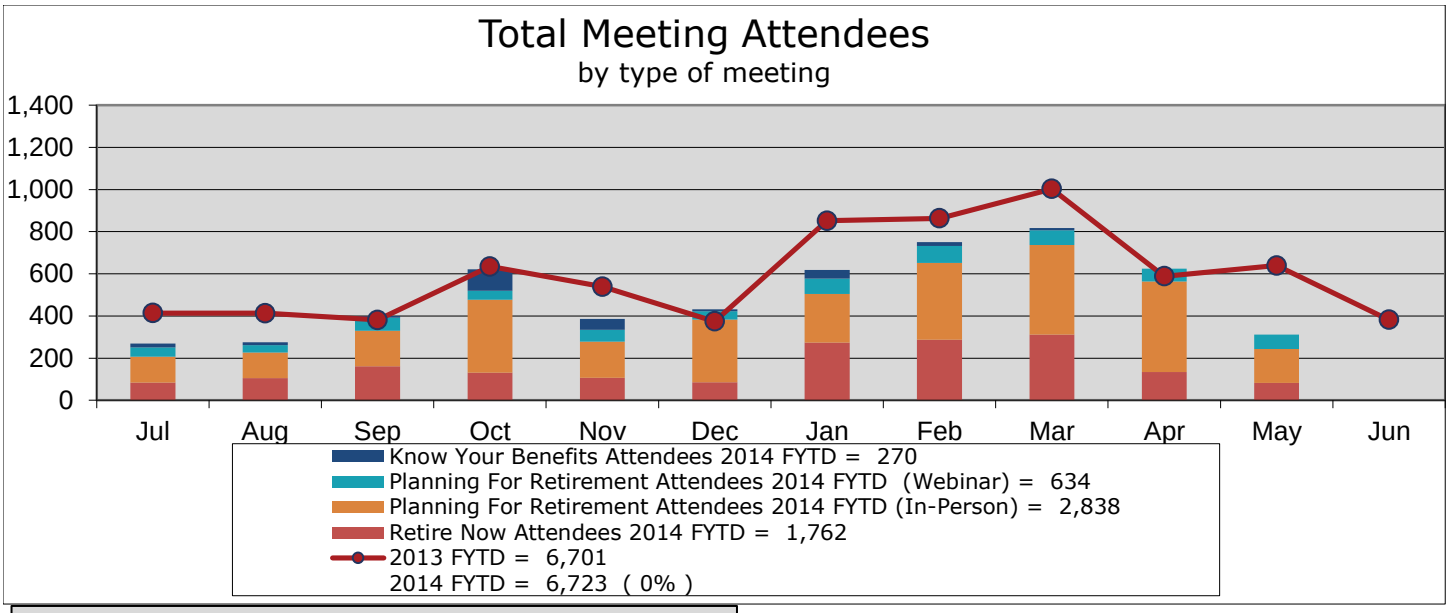
Timeliness (average response in business days)											
2	1	1	1	1	1						
Jul	Aug	Sep	Oct	Nov	Dec	Jan	Feb	Mar	Apr	May	Jun

Timeliness (average response in hours)											
						24.0	21.8	25.4	16.5	9.8	
Jul	Aug	Sep	Oct	Nov	Dec	Jan	Feb	Mar	Apr	May	Jun

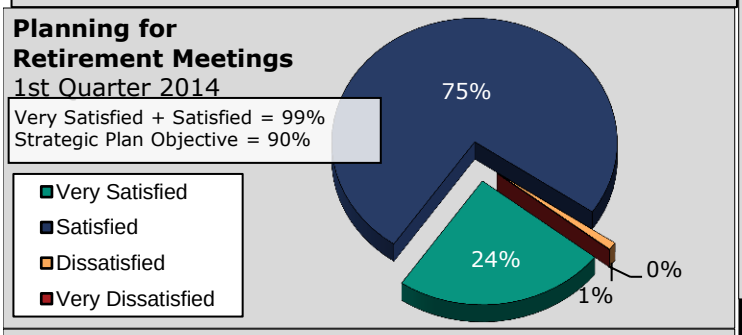
* Timeliness measure has been changed from measuring the number of business days to respond to the number of hours to respond. This change was effective starting in January 2014 and noted by the verticle line in the chart above.

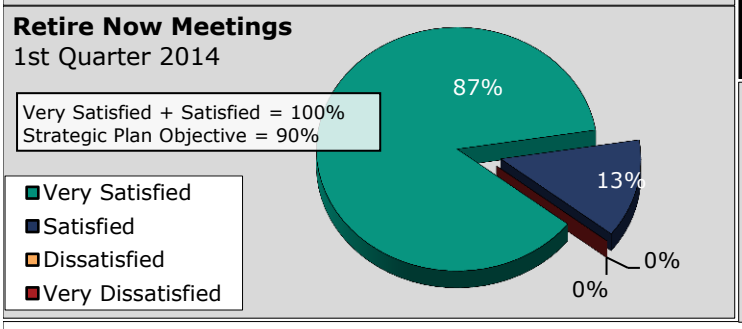


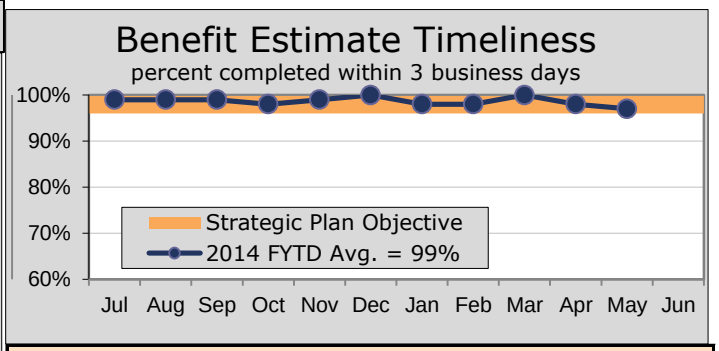
Outreach Education and Benefit Estimates



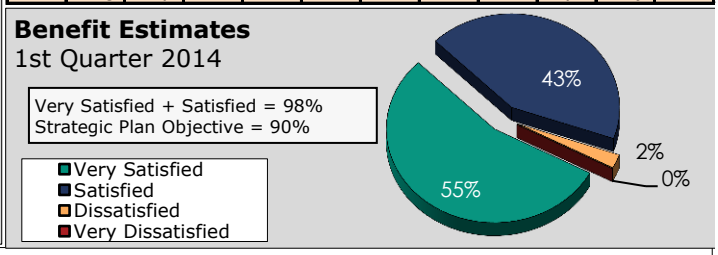
Member Satisfaction

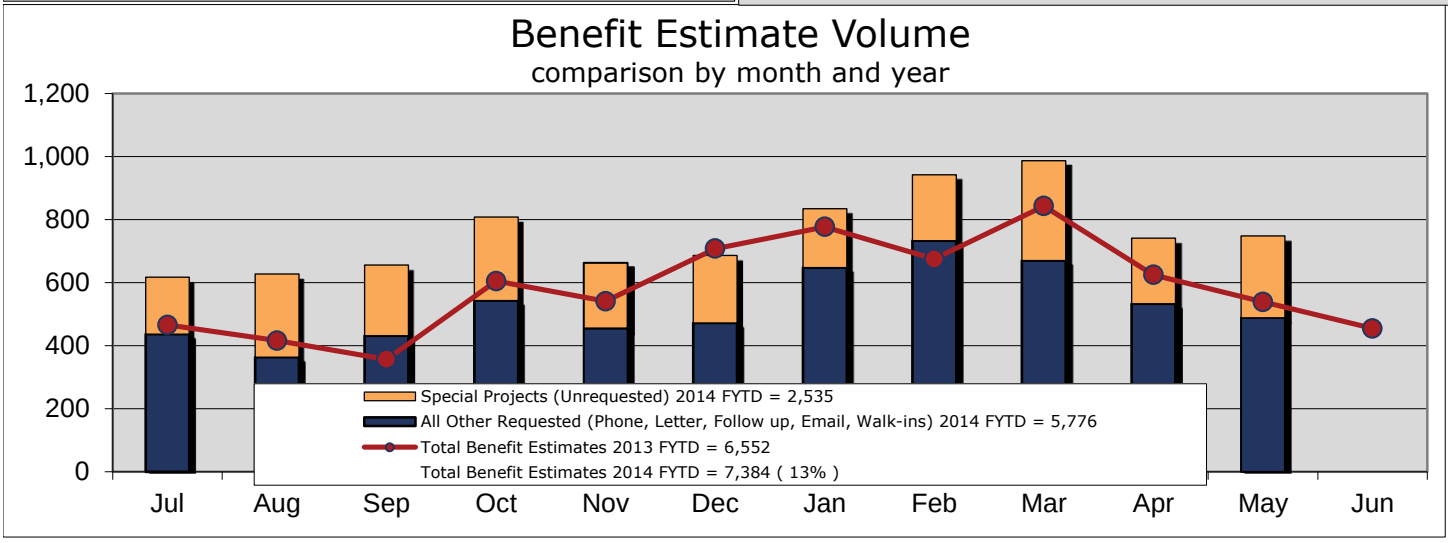




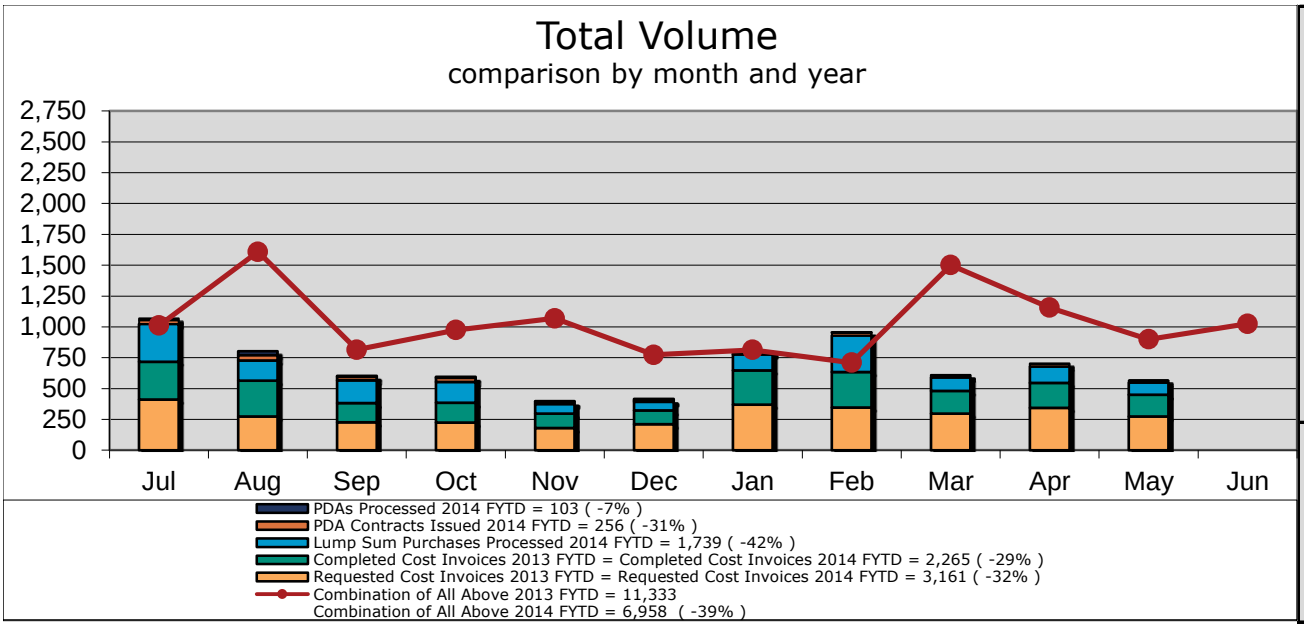


Benefit Estimate Timeliness (average TAT in days)											
1	1	1	1	1	1	1	1	1	1	1	
Jul	Aug	Sep	Oct	Nov	Dec	Jan	Feb	Mar	Apr	May	Jun





Service Purchase



Requests Pending

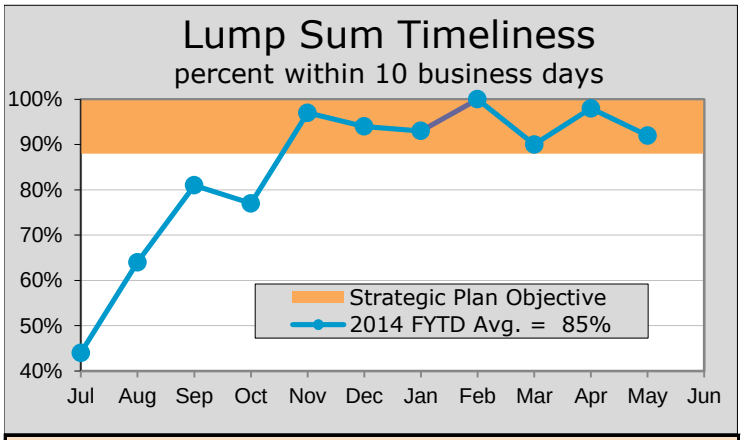
as of May 31, 2014

Cost Invoices Pending

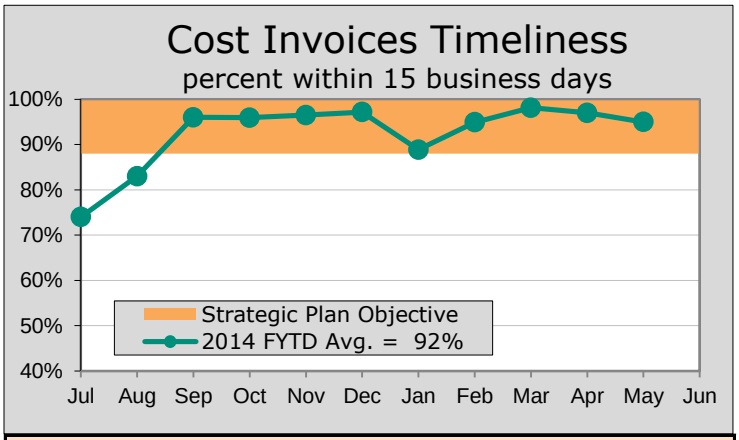
471

Payments Pending

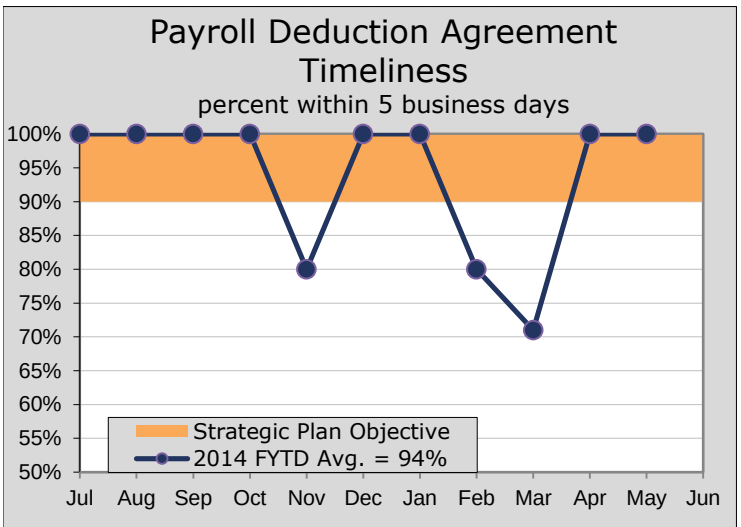
10



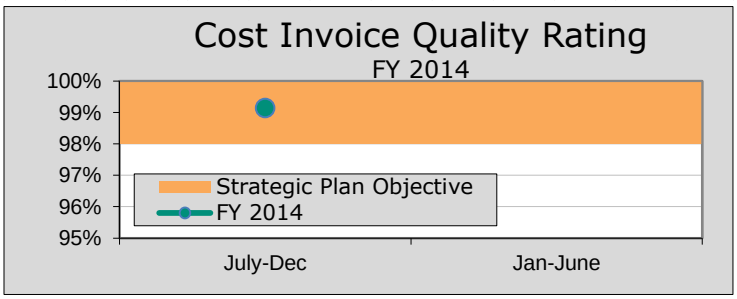
Timeliness (average turnaround time in business days)											
8	5	4	2	2	3	2	1	2	1	2	
Jul	Aug	Sep	Oct	Nov	Dec	Jan	Feb	Mar	Apr	May	Jun

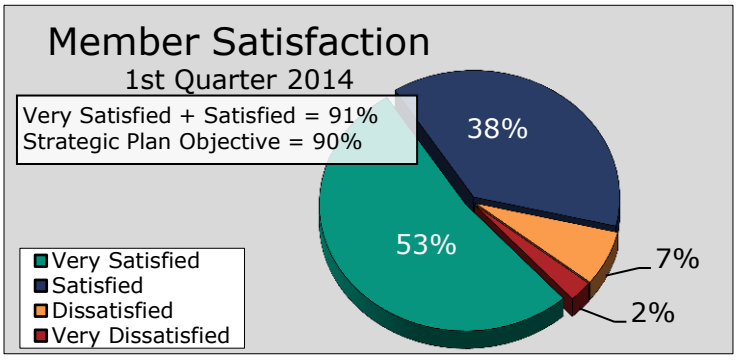


Timeliness (average turnaround time in business days)											
10	9	4	4	3	4	6	3	3	4	5	
Jul	Aug	Sep	Oct	Nov	Dec	Jan	Feb	Mar	Apr	May	Jun

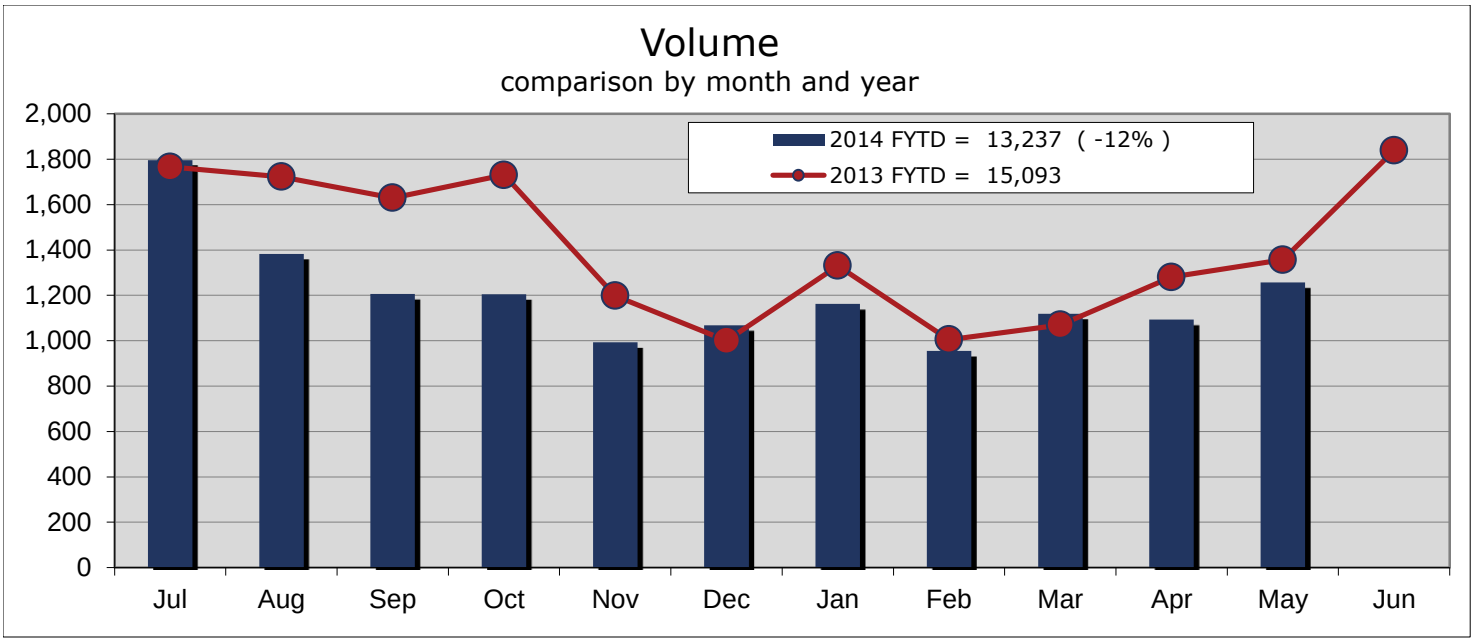


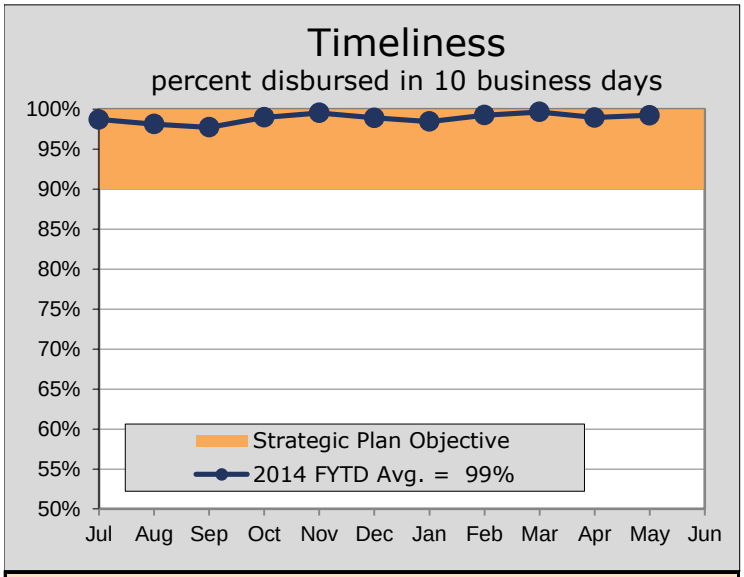
Timeliness (average turnaround time in business days)											
1	1	2	1	1	1	1	2	3	1	1	
Jul	Aug	Sep	Oct	Nov	Dec	Jan	Feb	Mar	Apr	May	Jun

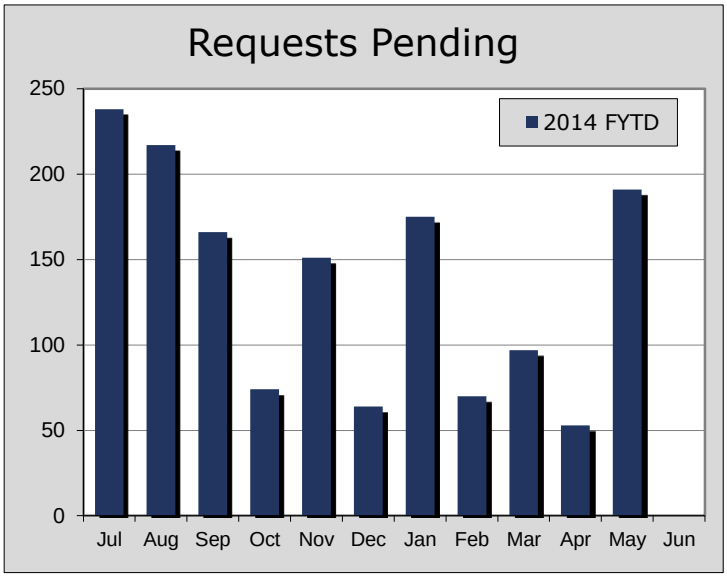




Refunds

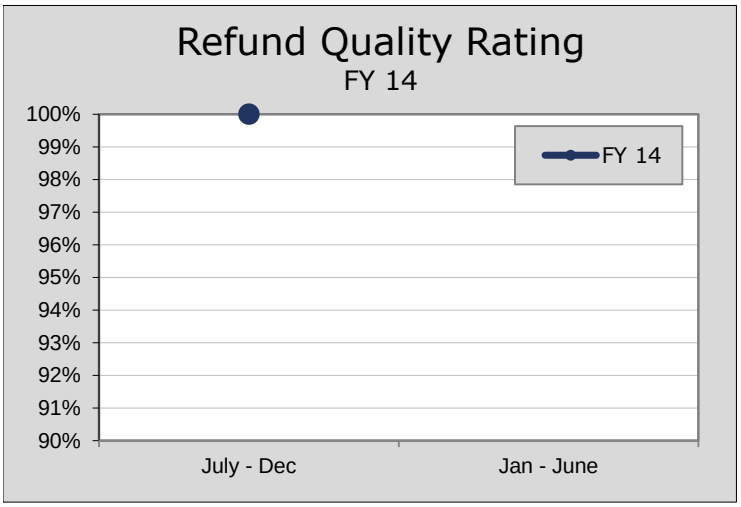


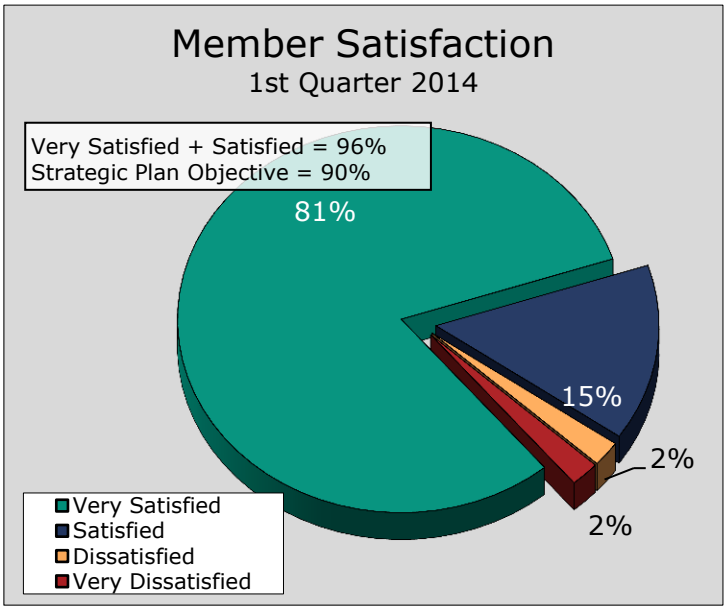




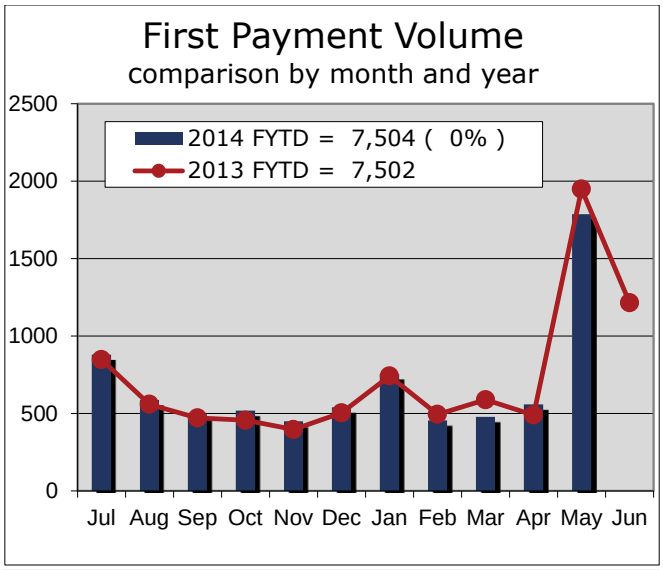
Timeliness (average turnaround time in business days)

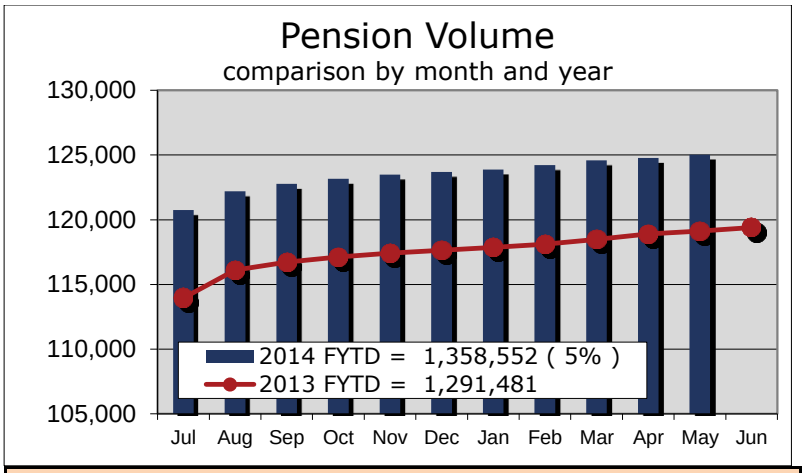
Jul	Aug	Sep	Oct	Nov	Dec	Jan	Feb	Mar	Apr	May	Jun
3	3	2	2	1	2	3	2	2	1	1	





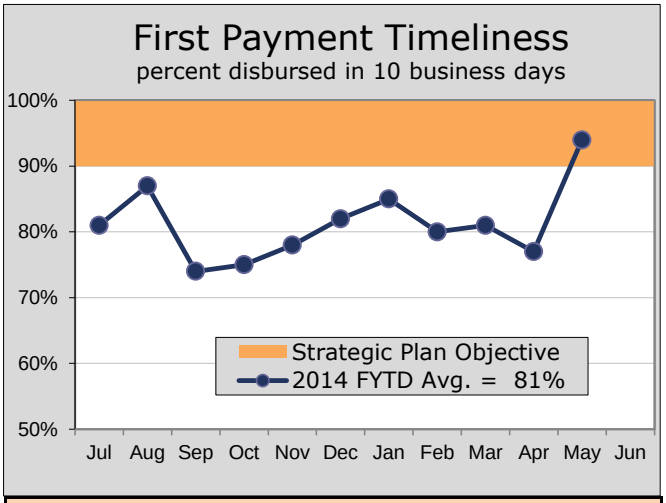
New Retiree and Pension Payroll





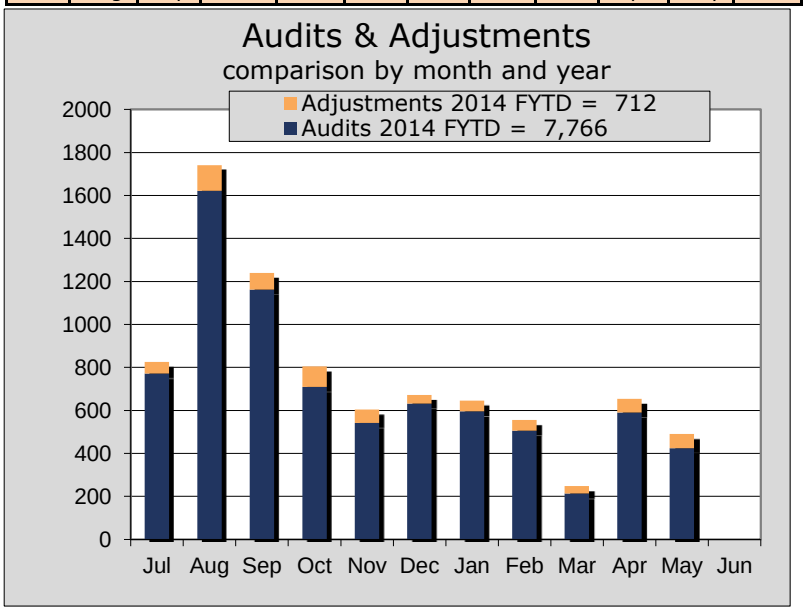
Pension Payment (percent disbured by 1st of the months)

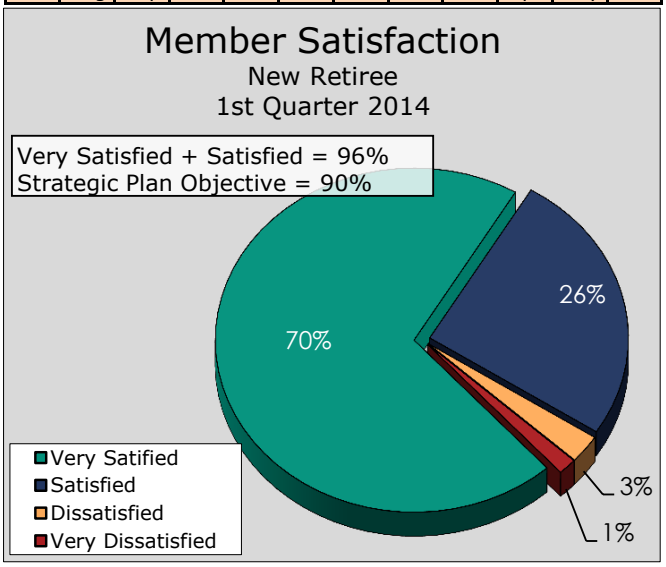
Jul	Aug	Sep	Oct	Nov	Dec	Jan	Feb	Mar	Apr	May	Jun
100%	100%	100%	100%	99.9%	100%	100%	100%	100%	100%	100%	

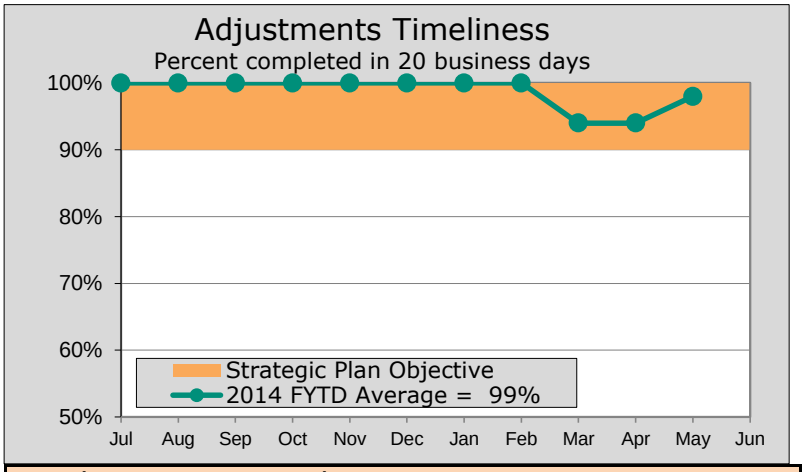


First Payment Timeliness (average turnaround time in days)

Jul	Aug	Sep	Oct	Nov	Dec	Jan	Feb	Mar	Apr	May	Jun
7	5	9	9	9	7	6	8	7	9	3	



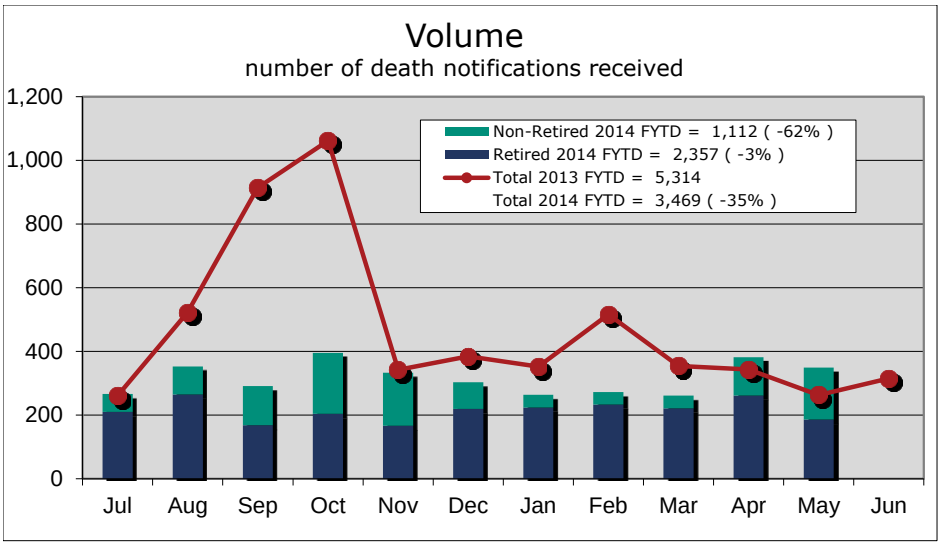


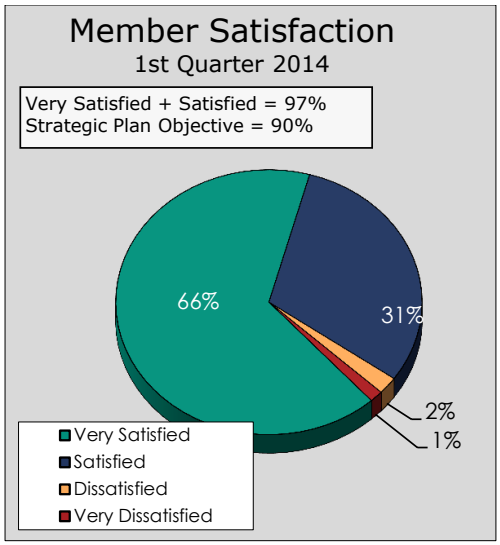


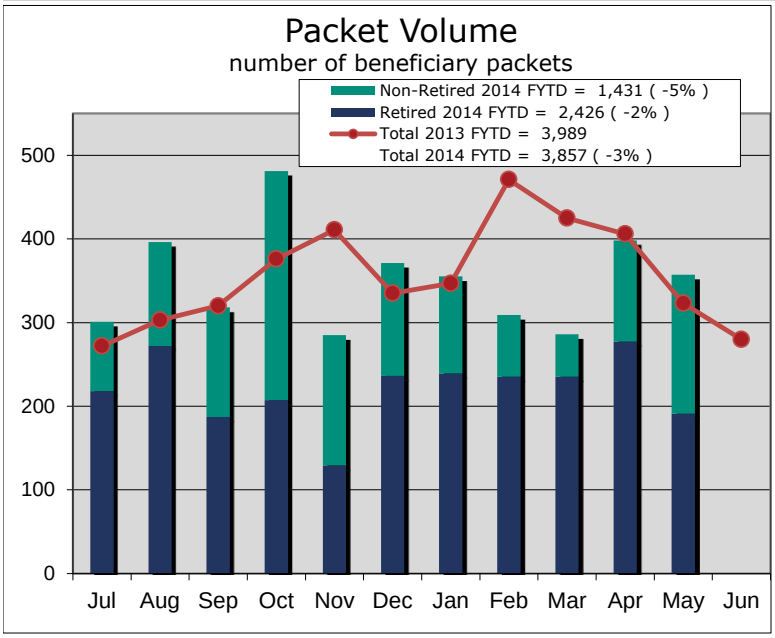
Adjustments Timeliness (average turnaround time in days)

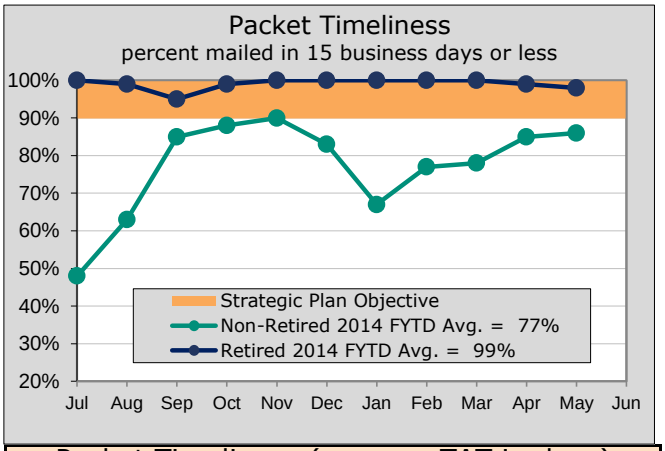
Jul	Aug	Sep	Oct	Nov	Dec	Jan	Feb	Mar	Apr	May	Jun
2	2	2	1	3	3	1	2	3	6	5	

Survivor Benefits



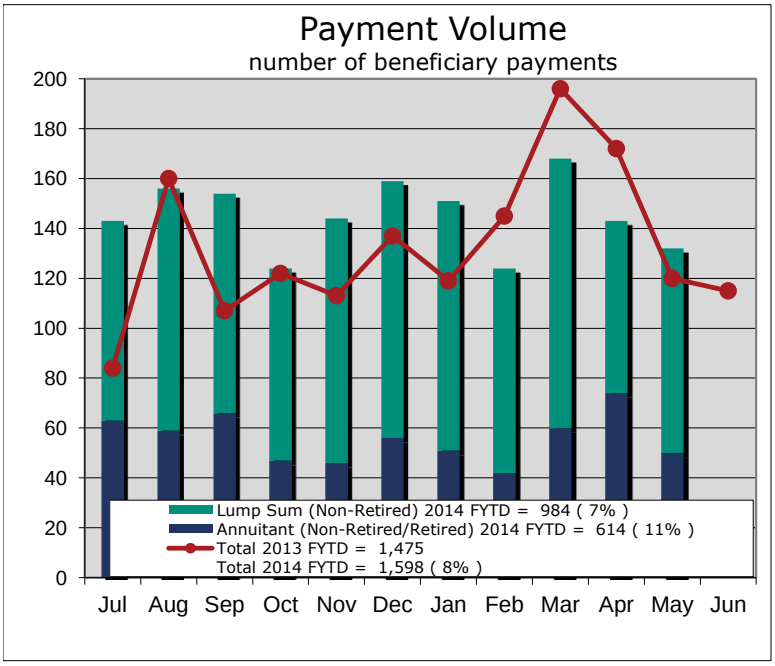


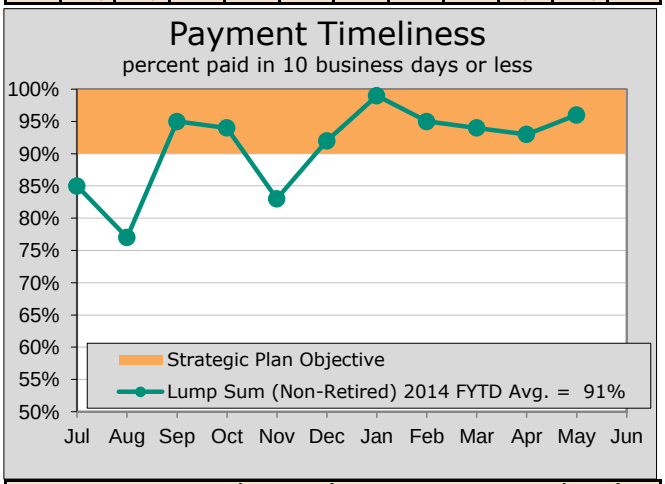




Packet Timeliness (average TAT in days)

	Jul	Aug	Sep	Oct	Nov	Dec	Jan	Feb	Mar	Apr	May	Jun
Non Retired	17	22	7	8	7	13	19	8	17	9	6	
Retired	3	3	4	2	2	2	2	2	2	2	2	



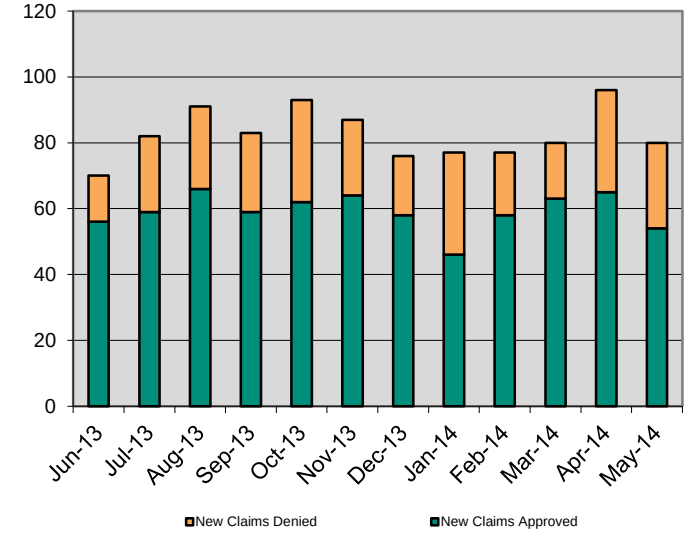


Payment Timeliness (average TAT in days)

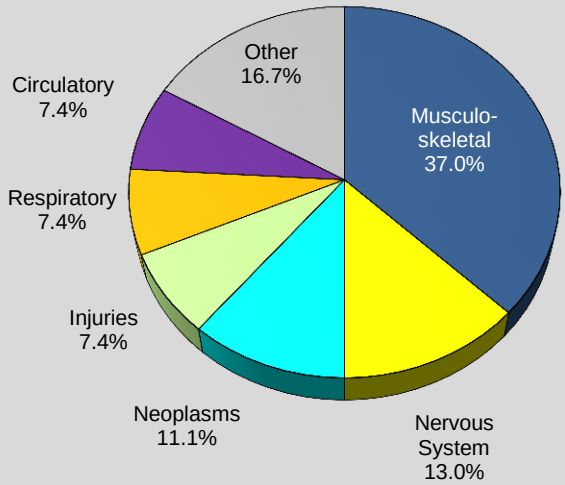
	Jul	Aug	Sep	Oct	Nov	Dec	Jan	Feb	Mar	Apr	May	Jun
Lump Sum (Non-Retired)	7	6	5	5	7	5	2	2	3	5	4	
Annuity (Retired and Non-Retired)	5	6	4	4	4	2	2	1	2	4	2	

ASRS Disability Plans - Monthly Highlights
May 2014

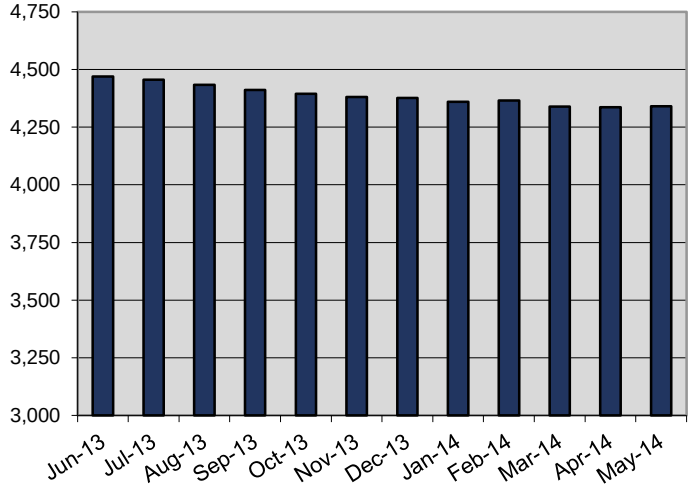
New Claims Processed



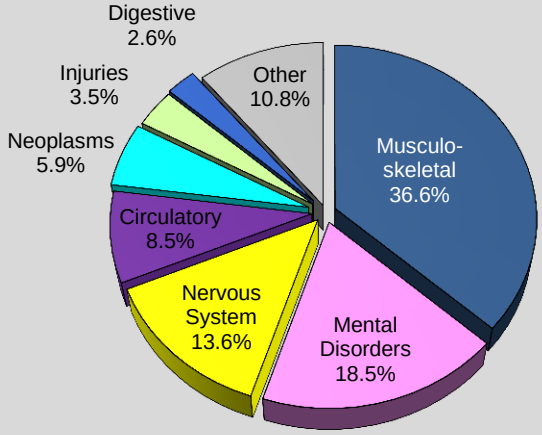
New Claims Approved



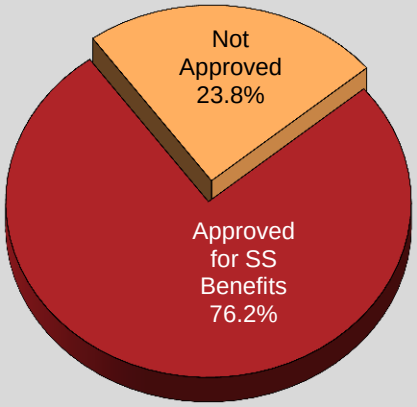
Open LTD Claims



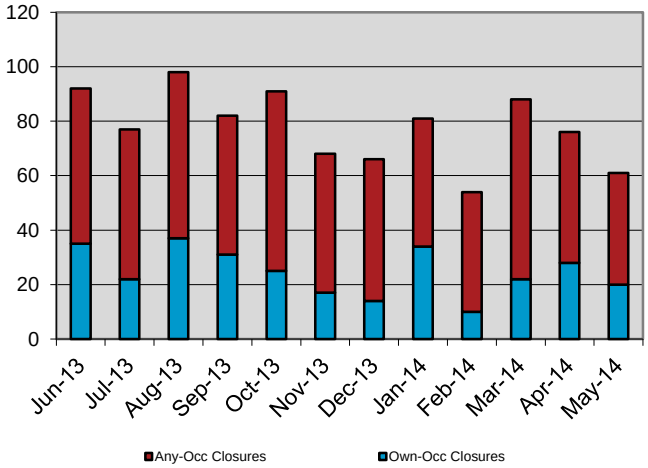
Open LTD Claims



SS Approval Percentage



Active Claim Closures



Arizona State Retirement System
FY 2014 Appropriated Budget
(as of May 31, 2014)

	APPROPRIATIONS FISCAL YEAR 2014	EXPENDED YTD	% EXPENDED
OPERATING BUDGET			
Personal Services	$ 13,024,000	$ 11,434,100	87.79%
Employee Related Expenses	$ 4,987,500	$ 4,444,500	89.11%
Professional & Outside Services	$ 775,000	$ 1,513,200	195.25%
Travel	$ 98,600	$ 72,400	73.43%
Other Operating Expenses	$ 2,655,500	$ 1,304,600	49.13%
Equipment	$ 389,500	$ 82,500	21.18%
Operating Subtotal	$ 21,930,100	$ 18,851,300	85.96%
OTHER APPROPRIATIONS			
Long Term Disability Administration	$ 2,800,000	$ 2,111,900	75.43%
Oracle Forms and Reports Modernization	$ 1,390,000	$ 1,088,100	78.28%
HB 2001 - Statewide IT and Automation Projects	$ 151,000	$ -	0.00%
SB 1170 - Survivor Benefits Modifications	$ 200,000	$ 200,000	100.00%
HB 2562 - 401(a) and LTD for Ineligibles	$ 502,400	$ 8,900	1.77%
TOTAL FY 2014 Appropriated Funds	$ 26,973,500	$ 22,260,200	82.53%

	APPROPRIATIONS PRIOR YEAR	EXPENDED TO DATE	% EXPENDED
PRIOR YEAR LEGISLATIVE APPROPRIATIONS (NON-LAPSING)			
FY 2013 - HB 2745 - Distribution Modifications	$ 47,000	$ 21,600	45.96%
FY 2013 - SB 1119 - Spousal Consent Modifications	$ 200,000	$ 61,300	30.65%
FY 2012 - SB 1609 - ACR Plan Design Changes	$ 250,000	$ 250,000	100.00%
FY 2012 - SB 1614 - ASRS Contribution Rate	$ 600,000	$ 526,900	87.82%
FY 2011 - HB 2389 - ASRS Plan Design Changes	$ 1,341,700	$ 1,177,400	87.75%

	APPROPRIATIONS REMAIINING	EXPENDED YTD	% EXPENDED
PRIOR YEAR OPERATING APPROPRIATIONS (NON-LAPSING)			
FY 2011, ASRS Operating Budget & LTD Admin	$ 796,800	$ -	0.00%

Budget Summary for Fiscal Year 2014
As of May 31, 2014

Operating Budget
The operating budget information on the previous page is based on funding approved by the Board and the Legislature for the fiscal year July 1, 2013 through June 30, 2014. These ASRS operating expenses are distinguished from other areas of ASRS spending authority: such as expenditures for investment management and benefits payments. Salaries and employee benefits, supplies, equipment and ongoing operational costs associated with information and financial systems for the ASRS Board and ASRS employees are funded from the operating budget. Expenditures to date include twenty-four pay periods (92.3% of the annual payrolls) of fiscal year 2014.

Other Appropriations
Other appropriations, which are considered part of the annual budget, represent other appropriations for specific programs or services authorized by the Board and the Legislature.

- **Long Term Disability Administration Fund**
  The amount appropriated for the administration costs of the LTD program. Expended year-to-date amounts reflect payments for services through 4/30/2014.
- **Oracle Forms and Reports Modernization**
  The amount appropriated (non-lapsing) for the first year of a five year software modernization project.

Non-Lapsing Appropriations for Legislative Initiatives

The amount appropriated by the Legislature for the implementation of:

- FY 2014 - HB 2001 - Statewide IT and Automation Projects
- FY 2014 - HB 2562 - 401(a) and LTD for Ineligibles
- FY 2014 - SB 1170 - Survivor Benefits Modifications
- FY 2013 - HB 2745 - Distribution Modifications
- FY 2013 - SB 1119 - Spousal Consent Modifications
- FY 2012 - SB 1609 - Alternate Contribution Rate Plan Design Changes
- FY 2012 - SB 1614 - ASRS Contribution Rate
- FY 2011 - HB 2389 - ASRS Plan Design Changes
- FY 2011 - ASRS Operating Budget and LTD Admin
  - HB 2024, Section 93 modified the FY 2011 ASRS appropriations to be non-lapsing appropriations. The ASRS has the ability to utilize the unspent portion of these appropriations in ensuing fiscal years.

<u>Explanation of Columns</u>

1) The Appropriated column represents funds that have been approved by the Legislature and the ASRS Board for FY 2014, and includes prior year legislative appropriations.

2) The Expended column represents the expenditures to date.

3) The % Expended column identifies the portion of each line item that has been expended year-to-date. This column is intended to be a guide to the rate of spending during the fiscal year.

ASRS FISCAL YEAR 2014, CONTINUOUSLY APPROPRIATED REPORT

(with summarized Appropriated Expenses)

DESCRIPTION	EXPENDED YTD as of 5/31/14	ESTIMATED ANNUAL EXPENSES (Projections updated quarterly)	EST. ANNUAL EXPENSES AS % OF AUM	EST. ANNUAL EXPENSES PER MEMBER
Custodial Banking, Security Lending and Master Cash STIF Fees	1,520,000	1,892,000		
Public Markets				
External Investment Management Fees	50,949,000	72,119,000		
Transactional and Other Fees	2,142,000	2,580,000		
Private Markets				
Private Equity Management Fees	28,849,000	40,040,000		
Private Equity Performance Incentive and Other Fees	25,733,000	34,311,000		
Real Estate Management Fees	14,355,000	23,513,000		
Real Estate Performance Incentive and Other Fees	16,845,000	22,460,000		
Opportunistic Management Fees	10,321,000	13,855,000		
Opportunistic Performance Incentive and Other Fees	23,041,000	30,721,000		
Investment Management Expenses	**$ 173,755,000**	**$ 241,491,000**	**0.719%**	**$ 445.31**
Investment Consulting Services	2,224,000	3,636,000		
Investment Related Legal Services	635,000	1,135,000		
Investment Electronic Information Services	1,357,000	1,476,000		
Investment Related Consulting, Legal and Information Services	**$ 4,216,000**	**$ 6,247,000**	**0.019%**	**$ 11.52**
Financial Consulting Services	**35,000**	**65,000**	**0.000%**	**$ 0.12**
Rent	**1,207,000**	**1,455,000**	**0.004%**	**$ 2.68**
Actuarial Consulting Fees	**$ 926,000**	**$ 1,366,000**	**0.004%**	**$ 2.52**
Retiree Payroll (Disbursement Administration)	**$ 1,908,000**	**$ 2,453,000**	**0.007%**	**$ 4.52**
Total Continuously Appropriated Expenses	**$ 182,047,000**	**$ 253,077,000**	**0.753%**	**$ 466.67**
Total Current Year Appropriated Expenses	**$ 22,260,200**	**$ 26,973,500**	**0.080%**	**$ 49.74**
Total Expenses (Continuously Appropriated and Appropriated)	**$ 204,307,200**	**$ 280,050,500**	**0.833%**	**$ 516.41**

ASRS Estimated Total Market Value of Assets Under Management (AUM) as of March 31, 2014	$ 33,602,800,000
ASRS Total Membership as of June 30, 2013	542,300

Continuously Appropriated Expenses for FY 2014
Estimated Expenditures

The Arizona State Retirement System (ASRS) investment and administrative costs are expended in accordance with Arizona Revised Statutes (A.R.S.), Title 38, Chapter 5, Article 2, Section 38-721. A.R.S. Section 38-721, Subsection C, lists specific expenditures that are continuously appropriated and are allowable in the amount deemed necessary by the Board.

These specific expenditures are described below:

1. **Investment management fees and related consulting fees necessary to meet the Board's investment objectives**

   Investment management fees
   - Public Markets
     - External investment management fees (public) year-to-date expenditure amounts reflect all of the fees due for the first two quarters of FY 2014 and eighty-five percent of the fees due for the third quarter of FY 2014.
     - Transactional and other fees include foreign taxes and commissions on derivatives and other incidental costs. These fees were added to this report beginning in February 2014.
   - Private Markets
     - Private Equity, Real Estate and Opportunistic Management fees year-to-date expenditure amounts reflect the fees due for the first three quarters of FY 2014.
     - Performance incentive fees include performance incentives and carried interest, which are only paid upon successful performance of the manager after other return hurdles are met. Other fees are the ASRS proportional share of the transactional and operational cost of the underlying investment structure. Each of these fees is only paid if earned or incurred, and therefore may vary each quarter. These fees were added to this report beginning in February 2014.

   Investment consulting fees
     - Includes investment related consulting and legal fees, electronic information services and subscriptions, custodial banking administrative fees, external auditing service fees.

2. **Rent**
   - Costs associated with rent as tenants for occupancy in the 3300 Tower in Phoenix and in the satellite office in Tucson. Payments have been made for rent through April 30, 2014.

3. **Actuarial consulting fees**
   - Costs associated with actuarial services related to plan design, administration and valuations.

4. **Retiree Payroll**
   - Costs associated with administering retiree pension benefits and disbursements, including third-party payroll administration fees, postage and benefit related consulting fees.

The report includes projected expenditures for the current fiscal year. Actual expenditures are reported monthly and estimated annual expenses will be reviewed and adjusted quarterly. The estimated annual expenses reflected were last updated as of the close of the quarter ending March 31, 2014.

ASRS Cost Savings Initiatives
Estimated as of June 30, 2013, in Millions of Dollars

	Action	Calendar Year Proposed	Calendar Year Adopted	Reduction in Total Contribution Rate*	Annual Reduction in Total Contribution Amount	Present Value of Savings on Closed Group Basis		Present Value of Savings on Open Group (No Growth**) Basis	
	Cost Savings Initiatives Contained in Current Valuation & Reflected in Lower Current Contribution Rate[1]					Past	Future	Past	Future
1	Change basis for service purchases from normal cost to actuarial present value (APV)	2003	2004	0.60%	$52.51	$667.40	$366.18	$667.40	$1,141.52
2	Correction of Permanent Benefit Increase (PBI) reserve	2003	2004	0.04%	$3.50	$44.30	$24.41	$44.30	$24.41
3	Decrease interest credited on withdrawn contributions from 8% to 4%	2004	2004	0.27%	$23.63	$349.95	$164.79	$349.95	$513.70
4	Decrease interest credited on withdrawn contributions from 4% to 2%	2012	2012	0.44%	$38.51	$40.58	$268.55	$40.58	$837.17
5	Redesign non-retired survivor benefits***	2013	2013	0.02%	$1.75	$1.84	$12.20	$1.84	$38.04
	sub-total, past and future			**1.37%**	**$119.90**	**$1,104.07**	**$836.13**	**$1,104.07**	**$2,554.84**
	sub-total, savings in current valuation			**1.37%**	**$119.90**	**$1,940.20**		**$3,658.91**	
	Cost Savings Initiatives Contained in Future Experience[2]					Past	Future	Past	Future
6	Long Term Disability (LTD) program design changes	2003	2004	0.02%	$1.75	$26.52	$12.20	$26.52	$38.04
7	Reimbursements for early retirement incentives	2003	2004	0.18%	$15.75	$233.08	$109.83	$233.08	$342.39
8	Increase interest rate on payroll deduction agreements (PDAs) from 0% to 8%	2004	2004	0.16%	$14.00	$207.62	$97.63	$207.62	$304.35
9	Pop-up restrictions	2005	2006	0.41%	$37.51	$415.67	$261.58	$415.67	$815.43
10	Rescinding modified Deferred Retirement Option Plan (mDROP)	2005	2006	0.50%	$43.72	$499.68	$304.89	$499.68	$950.43
11	LTD changes to offsets and pre-existing condition period	2005	2007	0.15%	$13.13	$128.03	$91.56	$128.03	$285.43
12	Recapture of unclaimed monies	2007	2008	0.01%	$0.56	$5.59	$3.91	$5.59	$12.17
13	Eliminate 80% cap on retirement benefits	2008	2009	0.04%	$3.50	$18.13	$24.41	$18.13	$76.09
14	Require 20/20 Rule for dual employment situations	2009	2009	0.04%	$3.25	$16.77	$22.66	$16.77	$70.65
15	Eliminate enhanced refunds****	2005	2010	0.16%	$14.07	$31.19	$98.12	$31.19	$305.87
16	Replace Rule of 80 with Rule of 85****	2006	2010	0.30%	$26.38	$58.47	$183.96	$58.47	$573.48
17	Replace 36-month average salary with 60-month average****	2006	2010	0.25%	$21.99	$48.73	$153.35	$48.73	$478.04
18	Apply Alternative Contribution Rate (ACR) to return-to-work****	2011	2011	0.25%	$21.99	$48.73	$153.35	$48.73	$478.04
19	Compute service purchases with 6% discount rate	2012	2012	0.08%	$7.08	$7.46	$49.37	$7.46	$153.91
20	Eliminate service purchases through partial lump sums	2012	2012	0.07%	$5.74	$6.05	$40.03	$6.05	$124.78
21	Eliminate Permanent Benefit Increases for future members	2013	2013	0.11%	$9.63	$10.15	$67.16	$10.15	$209.35
	Non-ASRS Initiatives					Past	Future	Past	Future
22	Replace Rule of 85 with 55&30 or 60&25****	2011	2011	0.00%	$0.60	$1.30	$4.18	$1.30	$13.04
23	Change pre-retirement death benefit to sum of employee and employer balances (ASRS Initiative)	2011	2011	0.04%	$3.22	$7.13	$22.45	$7.13	$70.00
24	Adopt 6-month delay in contributions from state members*****	2011	2011	-0.13%	$0.00		$0.00		$0.00
25	Prospective cost-shift of 6-month delay (not included in totals)*****	2011	2011	N/A	($11.63)	($25.48)	($81.08)	($25.48)	($252.74)
	sub-total, past and future			2.64%	$243.87	$1,770.30	$1,700.64	$1,770.30	$5,301.49
	sub-total, savings emerging in experience			**2.64%**	**$243.87**	**$3,470.94**		**$7,071.79**	
	GRAND TOTAL			**4.01%**	**$363.77**	**$5,411.14**		**$10,730.70**	

*These changes to the total contribution rate are multiplied by current payroll to give annual savings amounts in the next column. The annual savings amounts are then converted to the present values shown in the last two columns. These values include both accumulated past savings and estimated future savings. The savings from basing service purchases on actuarial present value is a reduction in future service liabilities. For the reduction in the interest crediting rate and the changes to LTD offsets and pre-existing condition period, the savings arise from reductions in future service and past service liabilities. Other Actuarial Valuation Basis savings are reductions to past service liabilities, i.e., capitalizations of the annual savings amounts over 30 years. Recapture of unclaimed monies will occur every year, but the numbers above are converted to a level annual savings amount.

** No growth scenario means that the projection maintains the size and age distribution characteristics of the current active population.

*** Redesign includes removal of $5,000 requirement to elect an annuity and elimination of the present value calculation.

**** Savings will increase each year, from zero to the open-group amount, as new hires become subject to the new provisions.

*****6-month delay will eliminate contributions for members with less than 6 months of service at the valuation date, but will transfer costs to other members and employers.
Cost will increase each year, from zero to the open-group amount as new hires are subject to the new rules.
Costs above give the combined effect of each bill -- if a bill changes three plan provisions, the cost of each reflects the adoption of the other two provisions.

Some of these changes will not be reflected in their entirety in the current valuation report, but will be captured in future reports as actuarial gains. For example, the Plan valuation contains no assumption on Payroll Deduction Agreements (PDAs), so the absence of interest charges in the past has been reflected as an actuarial loss. The change to 8% interest charges will end the losses and eventually reduce the total contribution rate by 0.16%.

Explanation of Cost Reduction Initiatives

[1]ASRS changed the basis for service purchases from the average normal cost rate to the actuarial present value rate. In this way, members who buy service pay the entire cost of their service purchases, and the purchases have no effect on contribution rates.
[1]ASRS reduced the rate of interest credited on members' account balances from 8% to 4% as of July 1, 2005.
[1]The 2001 addition to the Permanent Benefit Increase reserve was overstated in that year. ASRS corrected the reserve and thereby reduced the reserve committed to future Permanent Benefit Increase awards.

[2]Members can enter into Payroll Deduction Agreements to purchase service over time through payroll deduction. ASRS revised the method of calculating payments under these agreements to include 8% annual interest.
[2]ASRS members have been able to change the form of benefit they elect (e.g., joint & survivor to straight life) after they have begun to receive payments, and to do so as many times as they want whenever they want. By legislative action, this ability will be limited to a one-time election to change to a single life pension.
[2]Some ASRS employers have offered their employees incentives to retire early. These incentives can increase ASRS liabilities. By legislative action, future incentives will be funded by the employers who offer them.
[2]By legislative action, the modified Deferred Retirement Option Plan, which would have allowed members to earn as much as six years of service for three years of work, was rescinded.
[2]The legislature closed certain loopholes in the Long Term Disability program that allowed members to receive benefits for a longer period than intended.
[2]Legislation increased the offsets for Social Security income to 85% and extended the pre-existing condition period to six months.
[2]2008 Legislation exempts ASRS from unclaimed property procedures and allows ASRS to recapture assets abandoned after participant's age 73.5.
[2]2009 Legislation eliminated the 80% cap on benefits that had been in place since 2001.
[2]2009 Legislation requires a member to meet membership (20/20 Rule) in ASRS before contributing to a second employer, subject to a grandfathering clause.
[2]Upon withdrawal, members receive 25-100% of employer contributions depending on years of service. 2010 Legislation eliminates the return of employer contributions for members hired on or after July 1, 2011. Since 2010 changes are for prospective members only, we show open-group present values.
[2]Normal retirement can be achieved when a member's age + years of service equals 80 (points). 2010 Legislation requires members hired on or after July 1, 2011 to reach 85 points for normal
[2]Retirement benefits are calculated based on an average of the member's highest 36 months of salary in the 10 years prior to retirement. 2010 Legislation substitutes a 60 month average for members hired on or after July 1, 2011.

These rows represent legislative initiatives from non-ASRS sources.
2011 legislation replaced rule of 85 for members hired after 6/30/2011 with age 55 and 30 years of service or age 60 with 25 years of service.
2011 legislation changed the split of member/employer contributions from 50%/50% to 53%/47%, effective 7/1/2011
2011 legislation instituted a 6-month delay in contributions from or on behalf of members with less than 6 months of service, effective 7/1/2011.

Arizona State Retirement System
Staffing Report
(May 31, 2014)

ASRS by Division	246 Full Time Equivalents (FTEs)	New Hires	New Exits	Vacancies	Vacancy Rate
Administrative Services Division (ASD)	16×	0	0	4.75	29.69%
Director's Office (DIR)	11	0	0	1.0	9.09%
External Affairs (EAD)	11	0	0	1.0	9.09%
Financial Services (FSD)	62	1.0	0	2.5	4.03%
Technology Services (TSD)	48	1.0	0	6.0	12.5%
Internal Audit (IAD)	5	0	0	0	0.00%
Investment Management (IMD)	11	0	0	1.0	9.09%
Member Services (MSD)	83	1.0	0	2.25	2.71%
	247	**3.0**	**0**	**18.50**	**7.49%**

Turnover	May 2014 New Hires	May 2014 Exits	Total Exits (Last 12 Months)	Annualized Turnover %
	3.0	0.0	29	12.89%

×Note: The Chief Procurement Officer position located in ASD was assigned to the Arizona Department of Administration.

Pending Activity

ASD – Sr. Training/Development Officer (2): Currently recruiting for one position, recruitment complete for one position, start date 06/09/2014
MSD – Retirement Advisor Senior – Meetings: Currently recruiting
MSD – Retirement Advisor Senior – Appointments: Currently recruiting
TSD – Build/Release Engineer: Currently recruiting
TSD – Project Manager/Business Analyst (2): Recruitment complete for two positions, start date 06/09/2014
TSD – Software Engineer (3): Currently recruiting for two positions, recruitment complete for one position, start date 06/09/2014

Impact of Staffing (Vacancies, Recruitments, Internal Transfers) on ASRS Operational Performance

Agency Divisions	Services and Functions	Staffing Impact	Comments
Impact of Staffing on ASRS Operations:	**Green = Normal risk**	**Yellow = Greater than normal risk**	**Red = Negative impact**
MSD	MAC (Call Center)	●○○	
MSD	One-on-one Counseling (Appointments/Walk-ins)	●○○	
MSD	E-mail and Written Correspondence	●○○	
MSD	Outreach Education	●○○	
MSD	Tucson: Appointments/Walk-ins/Outreach	●○○	
MSD	Benefit Estimates	●○○	
FSD	Monthly Pension Payroll Processing	●○○	
FSD	New Retiree Processing	●○○	
MSD	New Retiree Processing	●○○	
FSD	Survivor Benefit Processing	●○○	
MSD	Survivor Benefit Processing	●○○	
MSD	Refund Processing	●○○	

Impact of Staffing (Vacancies, Recruitments, Internal Transfers) on ASRS Operational Performance

Agency Divisions	Services and Functions	Staffing Impact	Comments
Impact of Staffing on ASRS Operations:	**Green = Normal risk**	**Yellow = Greater than normal risk**	**Red = Negative impact**
MSD/FSD	Service Purchase Processing	● ○ ○	
FSD	Records Management (data processing/imaging)	● ○ ○	
IA	Internal Audit	● ○ ○	
EA	Employer Relations	● ○ ○	
EA	Rule Writing	○ ● ○	Limited rule writing functions have been carried out by ASRS staff and through the procurement of outside professional services. Executive management has prioritized recently several rulemakings that will impact the ability of limited and external resources to accomplish objectives in a timely manner.
EA	Legislative Relations	● ○ ○	
EA	Communications/Media Relations	● ○ ○	
EA	Web Services	● ○ ○	
EA	Health Insurance/LTD Benefits Administration and Communication	● ○ ○	
MSD	LTD Member Contacts, Benefit Processing	● ○ ○	

Impact of Staffing (Vacancies, Recruitments, Internal Transfers) on ASRS Operational Performance

Agency Divisions	Services and Functions	Staffing Impact	Comments
Impact of Staffing on ASRS Operations:	**Green = Normal risk**	**Yellow = Greater than normal risk**	**Red = Negative impact**
FSD	Health Insurance Member Contacts, Benefit Processing Transfer Processing	●○○	
MSD	Health Insurance	●○○	
FSD	Transfer Processing	●○○	
FSD	General Accounting	●○○	
FSD	Contribution Collections and Posting	●○○	
TSD	Network Support	○●○	The addition of the security professional has helped in our security activities while demonstrating the need for more resources to continue to mature the security program. In addition, our current daily tasks continue to consume our Tier I and Tier II resources making it difficult to manage user requests and complete the system upgrades. Recruitment for a Build/Release Engineer is currently underway.
TSD	Business Applications Development and Support	○●○	The planned workload requires a complement of 44 total resources (31 FTEs and 13 external resources). Our current complement of resources is 43 (26 FTEs and 17 external resources). In May 2014, one FTE (Technical Lead) was hired and two external resources exited. In June 2014, three FTEs (one Software Engineer and two Project Manager/Business Analysts) will start with one of the June hires hired from the external resources. With these hires, staffing will match the planned resources.
IMD	Investment Management	●○○	

Impact of Staffing (Vacancies, Recruitments, Internal Transfers) on ASRS Operational Performance

Agency Divisions	Services and Functions	Staffing Impact	Comments
Impact of Staffing on ASRS Operations:	**Green = Normal risk**	**Yellow = Greater than normal risk**	**Red = Negative impact**
DIR	Board/Executive Staff Support	●○○	
DIR	Strategic Planning/Analysis	○●○	Enhancements to the agency's enterprise wide risk management program implemented as a result of an internal audit, coupled with an increasing need throughout the agency for analysis, project management, and survey development/administration, are impacting the current resources' ability to develop, monitor, and report on strategic priorities, goals, and objectives.
ASD	Human Resources	●○○	
ASD	Training and Development	○●○	In May 2014, staffing was insufficient to meet the Training and Development Team's business needs and strategic objectives. Significant factors causing the strain on staffing were due to increased program development requests and implementation of strategies to improve retention. Recruitment for one position is underway; one position filled starting June 2014. Training and Development will continue to show a greater than normal risk until both positions are filled and trained.
ASD	Contracts and Procurement	●○○	
ASD	Facilities Management	●○○	
ASD	Budget Administration	●○○	

ARIZONA STATE RETIREMENT SYSTEM
COMBINED STATEMENT OF CHANGES IN TOTAL FUND CASH
FOR THE MONTH ENDED MAY 31, 2014

	Retirement Plan Fund	Retirement System Fund	Health Benefit Supplement Fund	Long-Term Disability Fund	Current Period May	Fiscal 2014 YTD May	Fiscal 2013 YTD May
ADDITIONS							
Contributions:							
Member contributions	$ 114,920,454	$ 4,942	$ -	$ 2,420,018	$ 117,345,413	$ 930,123,927	$ 885,529,821
Employer contributions	108,807,143	4,942	6,102,856	2,419,820	117,334,761	930,290,971	888,899,390
Alternative contributions (ACR)	2,631,723	-	59,676	53,709	2,745,108	22,435,252	20,033,346
ERRP reimbursement*	-	-	-	-	-	-	-
Transfers from other plans	225,195	-	-	-	225,195	965,701	1,219,492
Purchased service	1,856,567	-	-	-	1,856,567	27,641,243	36,077,253
TOTAL CONTRIBUTIONS	228,441,083	9,883	6,162,532	4,893,547	239,507,045	1,911,457,095	1,831,759,303
DEDUCTIONS							
Investment management fees and monitoring services	5,711,375	-	-	70,856	5,782,230	64,579,955	59,574,292
Retirement and disability benefits	209,525,502	3,261,679	8,444,517	5,211,275	226,442,974	2,466,493,870	2,553,493,396
Survivor benefits	3,572,932	-	-	-	3,572,932	36,878,733	35,734,543
Refunds to withdrawing members, including interest	15,668,989	-	-	-	15,668,989	213,192,116	189,098,792
Administrative expenses	2,950,501	-	-	222,538	3,173,039	33,999,609	33,316,593
Transfers to other plans	43,638	-	-	-	43,638	910,668	522,889
Other	2,234	-	-	-	2,234	44,981	(57,999)
TOTAL DEDUCTIONS	237,475,171	3,261,679	8,444,517	5,504,669	254,686,036	2,816,099,931	2,871,682,507
INCREASE (DECREASE)	(9,034,088)	(3,251,795)	(2,281,985)	(611,122)	(15,178,991)	(904,642,836)	(1,039,923,205)
From securities lending activities:							
Security loan program	112,922	-	-	-	112,922	1,698,355	1,283,421
Security loan interest expense / (Rebate)	(30,386)	-	-	-	(30,386)	(94,360)	(1,160,785)
Net income from securities lending activities	143,308	-	-	-	143,308	1,792,715	2,444,206
Capital Calls / (Distributions)							
Real Estate	(1,703,235)	(19,878)	(67,576)	-	(1,790,689)	122,507,362	86,720,827
Private Equity	29,874,345	-	1,347,325	-	31,221,670	71,489,486	163,028,347
Opportunistic Investments**	44,501,573	544,840	1,967,669	-	47,014,081	672,865,167	406,399,502
TOTAL Capital Calls	72,672,683	524,962	3,247,418	-	76,445,062	866,862,015	656,148,677
NET INCREASE (DECREASE)	$ (81,563,463)	$ (3,776,758)	$ (5,529,403)	$ (611,122)	$ (91,480,745)	$ (1,769,712,136)	$ (1,693,627,676)

* Represents Early Retirement Reinsurance Program reimbursements from Federal Government.
Funds can only be used to offset retiree health insurance costs per federal guidelines.

** Private Debt is included in Opportunistic Investments.

Date Received	Appeals	Issues/Questions Regarding	Status/Comments
01/23/2012	Arizona State University	Appellant is disputing an ASRS employer termination incentive program invoice.	ASU appealed to the Court of Appeals 02/12/2014. Court of Appeals case number is CA-CV 14-0083.
06/21/2012	Bonnie Pendergast	Appellant is seeking to purchase 9.89 service years.	OAH decision affirming ASRS staff decision; affirmed by ASRS Board 09/21/2012; MCSC appeal Case No. LC2012-000596 ASRS Board decision on 02/12/2013. Overturned. ASRS filed appeal to the Court of Appeals on 03/12/2013. Decision Affirming Superior Court.
04/22/2013	Luz Academy of Tucson & Adalberto M. Guerrero Middle School	Appellant is disputing an ASRS audit that designated four individuals as ineligible for ASRS membership.	OAH decision partially affirming ASRS staff decision; accepted by ASRS Board on 09/27/2013. Luz Academy appealed to Superior Court. MCSC Case No. LC2013-000572-001DT. Oral Argument scheduled for July, 2014.
02/4/2014	Alice Schireman	Appellant is disputing that there are no ASRS survivor benefits remaining on ASRS member, Alvin Schireman's account.	OAH hearing held on 04/10/2014. **Recommended decision on 06/27/2014 agenda for Board action.**
02/10/2014	Arthur Gross	Disputing the ASRS use of forfeited salary information for the purposes of calculating his pension benefit.	OAH hearing held on 04/07/2014. **Recommended decision on 06/27/2014 agenda for Board action.**
02/25/2014	Adam Morris	Disputing his membership eligibility for fiscal years 2001, 2004 and 2005 and is requesting an invoice for contributions not withheld during that time.	OAH Hearing held on 04/21/2014. **Recommended decision on 06/27/2014 agenda for Board action.**
04/21/2014	James P. Kelly	Disputing ASRS inability to forgive overpayment owed due to erroneous contributions submitted by City of Surprise.	**OAH Hearing cancelled by appellant.**

- Please note any updates have been bolded.

ARIZONA STATE RETIREMENT SYSTEM

3300 NORTH CENTRAL AVENUE • PO BOX 33910 • PHOENIX, AZ 85067-3910 • PHONE (602) 240-2000
7660 EAST BROADWAY BOULEVARD • SUITE 108 • TUCSON, AZ 85710-3776 • PHONE (520) 239-3100
TOLL FREE OUTSIDE METRO PHOENIX AND TUCSON 1 (800) 621-3778
EMAIL ADDRESS: ASKMAC@AZASRS.GOV • WEB ADDRESS: WWW. AZASRS.GOV

Paul Matson
Director

MEMORANDUM

TO: Mr. Tom Manos, Chair, Arizona State Retirement System (ASRS) Board

FROM: Mr. Paul Matson, Director

DATE: June 12, 2014

RE: Delinquent Employers

As of June 12, 2014, the following employers have failed to remit contributions by a date certain. These employers have received a letter advising them that the ASRS will initiate collection procedures unless they contact us within five days:

Westwind Academy	$ 30,100*
Harquahala Valley Irrigation District	$ 7,600*
Park View Middle School	$ 10,800*
Destiny School	$ 24,000*
Starshine Academy	$ 48,000*
Caurus Academy	$ 27,300*
Chevelon Butte Elementary District	$ 1,300*
NO Apache CO Special Health Care District	$ 8,500
Kids At Hope Academy	$ 14,000*
PACE Preparatory Academy	$ 5,000*
Total	$176,600*

* Estimated amount

Additionally, the following employer has filed for Chapter 11 Bankruptcy Protection and is delinquent in their ASRS contributions:

Luz Academy of Tucson	$ 18,600
Total	$195,200*