

Wyoming State Treasury

Risk & Staffing Analysis

May 31, 2016

Cutter
ASSOCIATES

Discussion Draft

Risk Analysis

A day of interviews in Cheyenne and a day of discussions and prioritization with WST management. This report is high level, preliminary, and for **planning purposes only**. We recommend a deeper analysis including:

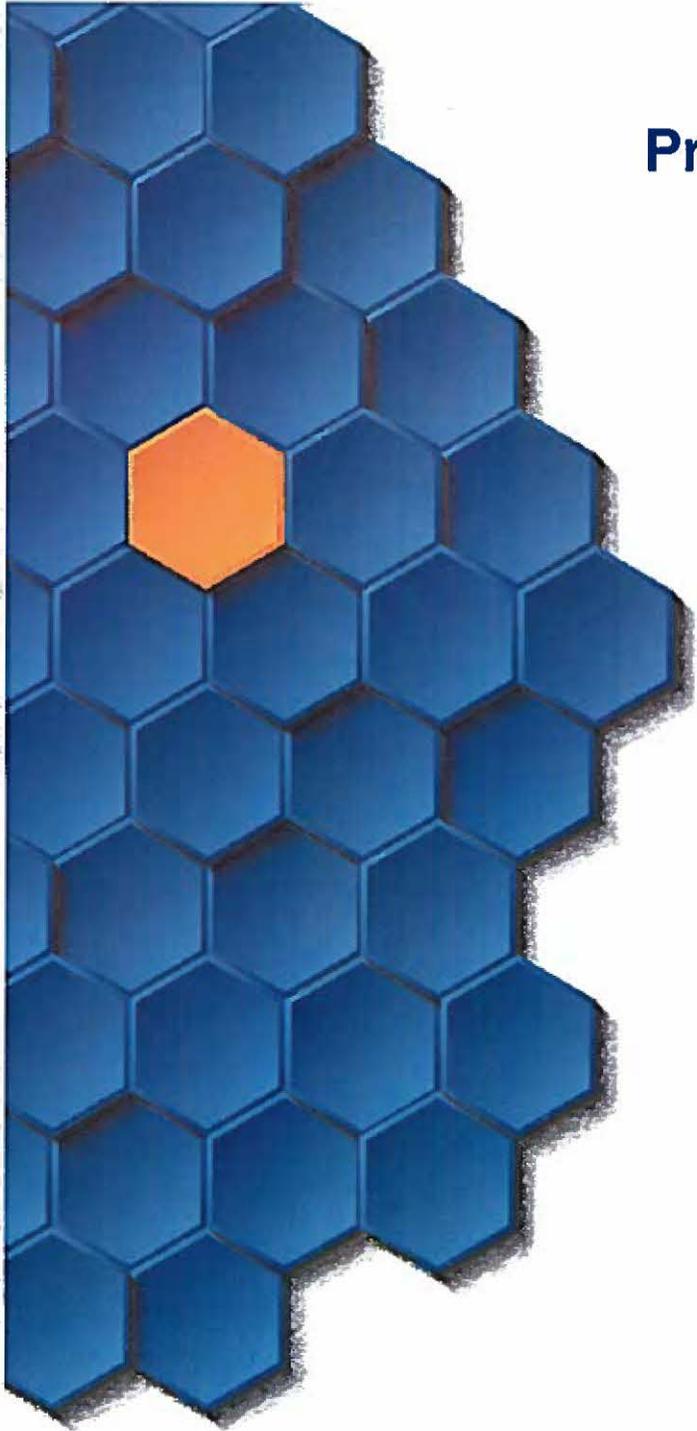
- ◆ **Current State Assessment**
- ◆ **Solution Assessment for Priority Risk items**
- ◆ **Target State Analysis – Systems & processes to implement in FY 2017-2019.**
- ◆ **Roadmap Planning – Tasks to move WST from Current State to Target State**

Staffing Analysis

After an incremental and historical staffing analysis we recommend 4 new Staff positions in FY 2017 plus 2 new Staff positions in FY 2018 – 2019 & additional IT resourcing. We assume some consulting for process definition & implementation.

- ◆ **Incremental Analysis**
- ◆ **Historical Analysis**
- ◆ **Peer Analysis – based on 2009 Cutter Benchmarking Survey, *Operational Costs and Allocation of Resources***

Preliminary Risk Analysis



Risk Analysis

Risk Area	Risks	Next Steps	Priority
1 Staffing Levels	Significant gaps in External Management Oversight, Risk Management, Custodian Oversight and Business Analysis	Cutter provides Comparative, Incremental & Historical Analysis. Staffing Levels need to be added as Work Priorities shift to review from do.	Critical
2 Trade Allocation	Allocation of each trade to up to 9 funds performed by spreadsheets & systems in a hard to review way poses significant risk of error and newsworthy event.	Solution exploration would be part of Target State & Roadmap Analysis	Critical
3 External Manager Oversight	Lack of oversight guidelines increases risk and has increased management fees which lowers fund performance	Develop & Maintain Oversight Process	Critical
4 Trade Process Automation	Manual processing by at least 5 people for each internal trade increasing risk of trade errors.	Defining a new, more automated & concise trade posting process would be part of Target State & Roadmap Analysis	High
5 Limits to better investment opportunities	Fixed Income overweighted during a prolonged period of historic low income and expectation of market prices to fall when interest rates do rise.	Address Higher Priority Items, but list best potential new types of opportunities which can be incorporated into the Target State & Roadmap	High
6 Technology Refresh	Windows 7 support ended 17 months ago. Desktop technology issues has introduced compatibility risk with external systems and vendors, supportability & security risk.	Current State Assessment would document Current Standards & Issues & would discuss options with Wyoming State IT & propose solutions.	High
7 Governance	Investment Board currently is the top 5 elected officials in Wyoming which increases political risk. Without Board Members with Investment Management expertise, risk tend to increase while returns tend to be lower.	Include more Investment Industry experience as part of Governance.	High
8 Service Provider Oversight	Custodians tend to provide service based on negotiated & enforced service levels. The current level of oversight tends to decrease services & increase risk & losses like the 2009 losses	Manage Custodian Relationship Closer (Review Reconciliations, Collateral Quality, Partner with Custodian to better leverage their services...)	High

Risk Analysis - Continued

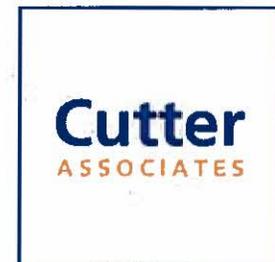
	Risk Area	Risks	Next Steps	Priority
9	Business Continuity Planning	Funds could be impacted adversely by rail explosion, severe winter storm or other disasters.	External Review of Business Continuity Plans. Test BCP at least annually & with key vendors & External Managers.	Medium
10	Better Building Security	General Public has easy access to State Treasurer & Investment Professionals from 8 AM to 5 PM. All employees enter & exit building through a below street level door with limited visibility & lighting.	Control access to your Suite	Medium
11	Broker Limitation	Unnecessary limitation to only 3 brokers for a period of 5 years increases counterparty risk and decreases fund performance.	Move Broker Decisions to Investment Board & remove approved brokers from public website.	Low
12	Investment Management Agreements - External	Agreements do not include standard protective sections on related party transactions, fair allocation, market timing, code of ethics and terrorism. Guidelines for proxy voting and corporate action elections not included.	Strengthen Agreement Templates & review year or 2 with External Counsel with Investments expertise.	Low

Critical	Needs Legislative & WST action
High	Needs WST action
Medium	Needs WST attention
Low	Currently working on smaller changes

1. Detailed Analysis would focus on Cutter's strengths - Items 2, 4, 6 & 8
2. Cutter would request a preliminary list of new Investment Opportunities or Strategies (Item 5) that would like be used in the future for the Detailed Analysis.
3. WST will continue to address Physical Security (Item 10).
4. Cutter can provide some support, contacts & data points for the remaining items (1, 3, 7, 9, 11 & 12) as WST needs with some resource constraints.



Staffing Analysis



Staffing – Incremental Analysis

Incremental Analysis recommends 4 new positions to address the largest areas of limited resources (highlighted in yellow below). 2 in Investments (External Manager Oversight, Asset Allocation, Risk Management), Finance (Custodian Relationship Management-CRM) & a Business Analyst.

	FY 2001 Actual	FY 2016 Actual	Recommended Staff Additions	FY 2017 Recommended	% Change Rec. vs. 2001
Investments					
• External Manager Oversight					
• Asset Allocation					
• Risk Management					
• Portfolio Management					
• Trading					
Finance					
• Custodian Relationship Mgmt.					
• Accounting					
• Investment Operations					
Business Analyst					
Totals	3	6	4	10	+ 233%

Investments

Investments has 2 FTEs in 2016 & in 2001 (range - 1 to 3 Staff since 2001, External Oversight not a priority every year) Risk Management has grown as a function at most managers while WST has assumed risks unknowingly which caused problems in the 2009 market downturn. Additions to help with External Oversight, Asset Allocation & Risk Management recommended. An addition for Real Estate & Alternatives could be considered if these asset types are invested in directly or increase allocation.

Finance

Finance team works on Investments & other WST areas. FTE counts are based on each FTEs portion of work on Investments tasks. An addition of a Custodian Relationship Manager CRM to provide more oversight is recommended.

Business Analysts

Business Analysts (BA) help WST automate & address data & other issues. Without BAs, risk increases, automation & data quality decrease over time.

Totals

Totals exclude Investment Board, State Treasurer, Assistant State Treasurer, Legal, IT, Reception & other functions shared across other WST programs. Historically, IT had 2 staff. Wyoming pooled most IT resources across State offices. Onsite support is provided by 1 staff member of WST while the other IT resources is part of the Pool that provides infrastructure including servers, emails & connectivity.

Priorities

Priorities at WST and many small & medium sized Investment Managers have shifted to those shown by order in the table. WST processes were created for the functions in white. WST needs to focus more on oversight & the monitoring of assets & less on the remaining internal accounts.

Staffing – Historical Analysis

	FY 2001 Actual	FY 2016 Actual	% Change
Assets Under Management	\$4.4 B	\$19.5 B	+343.2 %
AUM Managed Externally	\$1.8 B	\$19 B	+955.6 %
AUM Managed Internally	\$2.6 B	\$0.5 B	-80.8 %
Funds	6	9	+50 %
External Managers	8	40	+400 %
Asset Types	3	9	+200 %
Investments Staffing	2	2	0 %
Finance Staffing	1	4	+300 %



FY 2001 to 2016 Workload % Change	Investments	Finance
Workload Change– Adjusted for external managers shift	+ 151.5 %	+270.1 %
Workload Change– Adjusted for shift to external managers AND increased complexities	+ 201.5 %	+359.1 %



Cutter estimates that Investments & Finance Workload increased by 151.5% & 270.1% over the 15-year period when adjusted for External Manager mix, See **note A** on the next slide for more on this adjustment & the Complexities adjustment.

Staffing – Historical Analysis

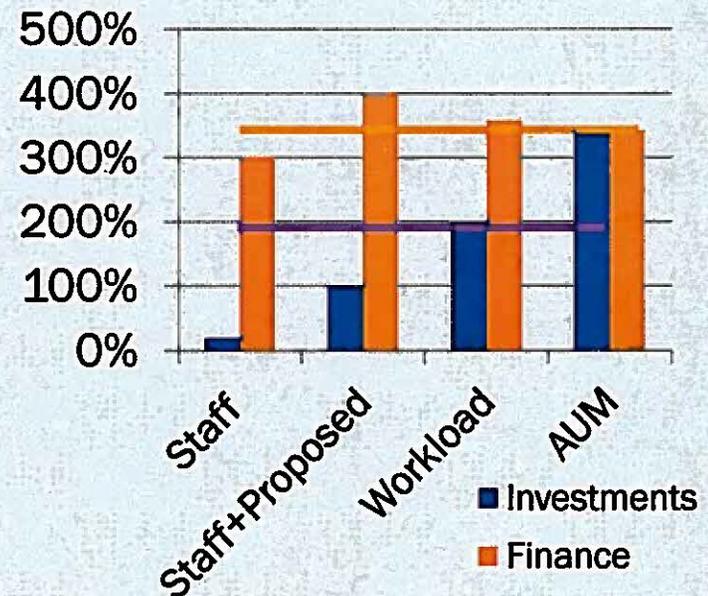
Investments Staffing has not increased in 15 years and has lagged far behind **Investments Workload** (+201.5%^A) & **AUM** (343.2%).

Finance Staffing has increased from 1 to 4 FTEs (+300%) working on **Investments**. **Finance Workload** increased by 359.1%^A.

WST Staff Increases Compared to Workload & AUM % Increases By Business Group

Investments - Compare Line for indicates Increasing Staff to 4 is a step in the right direction but 6 compares better, but Cutter recommends starting with 2 additional resources in FY 2017 and expects additional Staff with additional expertise to follow.

Finance - Compare Line shows Workload close to Staff % (with or without proposed addition)



A -Workload estimates increase in work for a department by starting with AUM changes. Then Reduced for work that has been outsourced to External Managers and other Vendors, Adjust for net new complexities during the period. External Managers slows Investments Workload increase more so than Finance's Workload increase.

B -WST, Investments and Finances, has outgrown its business processes that have not been updated significantly since 2001. They do not fit the current requirements and industry practices. Increases to AUM and other metrics tend to increase Workload linearly. With new processes, Staffing can increase slower than linearly and provide some economies of scale.

WST Investment Staffing – Comparing the 3 Analysis

Cumulative 15-year Staffing Increases by Department by Analysis Type

	Incremental	Historical	Comparison
Investments	+100.0 %	+ 201.5%	Investments will still lag after 2 new Staff in FY 2017. With current data, an addition of 1 or 2 more should be expected in 2018 or later
Finance	+400.0 %	+359.1 %	COMPARES 

Cutter Recommends:

1. Better Understanding of WST Core Functions & the expected mix of External Managers & Vendor Services.
2. Introductions to Cutter’s most comparable Government Clients.
3. Cutter could potentially Benchmark Government Managers with similar AUM & External Management & Vendor Solutions.

Peer Analysis is less comparable because:

Study does not take in account External Manager & Vendor Solutions which has become a major industry trend since 2009.

CutterBenchmarking - Peer Analysis

Participating Firms

Small < \$30 B	Medium \$30 B – \$100 B	Large > \$100 B
<ul style="list-style-type: none"> Alaska Retirement Management Board Colorado PERA Missouri State Employees Retirement Sys Texas Permanent School Fund University of Texas Investment Mgmt Co 	<ul style="list-style-type: none"> Alaska Permanent Fund Corporation New Jersey Division of Investment NY State Teachers' Retirement (NYSTRS) North Carolina State Treasurer Oregon State Treasury Pennsylvania Public School Employees Retirement System (PSERS) State of Wisconsin Investment Board State Teachers Retirement Sys of Ohio Virginia Retirement System Washington State Investment Board 	<ul style="list-style-type: none"> CA Public Employees' Retirement CALPERS CA State Teachers Retirement System CALSTRS Teacher Retirement System of Texas

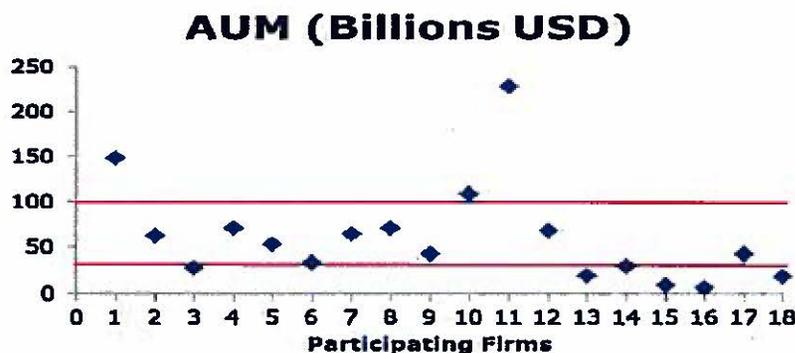
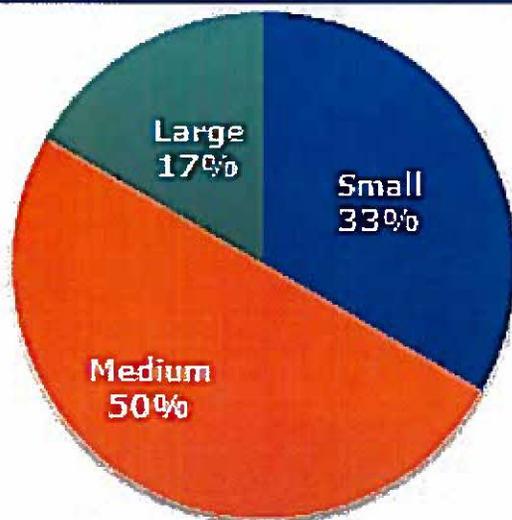
Participant AUM Statistics

Average: \$61.4 B

Minimum: \$6.2 B

Maximum: \$228 B

Participant Peer Groups



Cutter Benchmarking - Peer Analysis

	Peers	WST Current FY 2016	Recommended FY 2017	Expected FY 2018 - 2019
Investments <ul style="list-style-type: none"> • Asset Allocation • Portfolio Management • Trading • Risk Management 	17.5	2	4	6
Finance <ul style="list-style-type: none"> • Custody Relations • Accounting • Investment Operations 	16.4	4	5	5
Business Analysts	3.0	0	1	1
Information Technology	14.7	1 + Pool^A	2 + Pool^A	2 + Pool^A

Source: Cutter Benchmarking Operational Costs and Allocation of Resources survey from 2009 responses from 6 State Government Managers (Pensions, Funds) with AUM < \$30B. This study did not separate data based on internal vs. external managers & providers. WST leverages external managers for 95%+ of its assets which reduces Investments staff considerably and other Groups' staff to some degree.

A – Technology includes 1 onsite resource & other resources from the Wyoming State IT Pool. Additional resource for developing & supporting automation are recommended.



About Cutter



Cutter Associates works collaboratively with investment managers to shape reliable, agile and integrated solutions that address business needs and support corporate strategies.

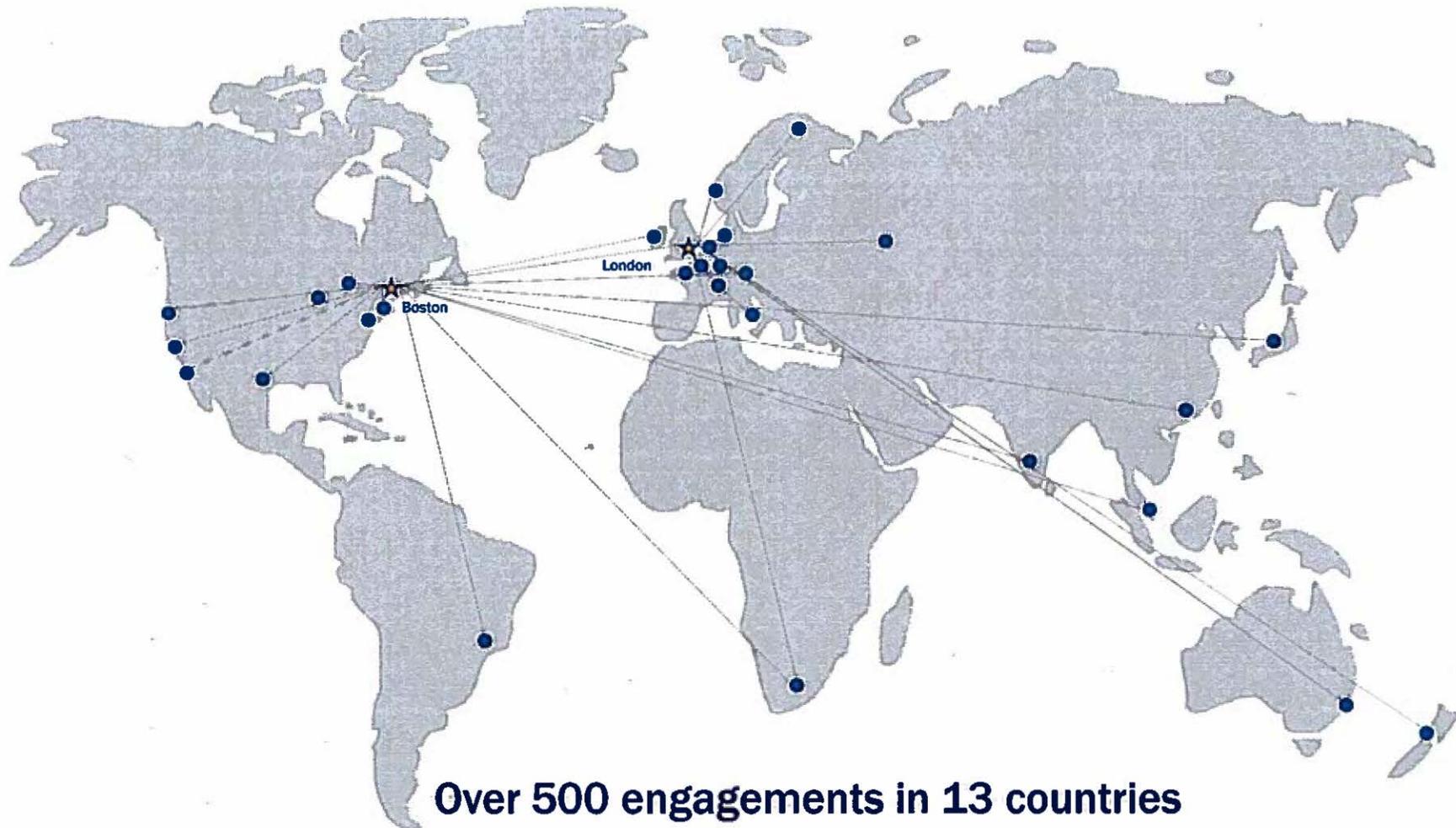
By leveraging multi-faceted expertise and an unrivalled knowledgebase, we have established ourselves as a well-respected and trusted provider of truly independent research, a global consultancy for delivery of operational excellence and a provider of revealing and actionable capability metrics.



- In-depth Proprietary Research
- Operations Benchmarking
- Market Understanding
- Hands on Expertise
- Current State Assessment
- Future State Architecture & Design
- Strategic Roadmap
- Tailored Solution Advisory
- Fully Delivered Solutions
- Focused Support

A Global View

We are a global consultancy dedicated to rethinking and reshaping business processes together with our clients – wherever they need us.



Representative List of Clients

PENSION FUNDS

APG Asset Mgmt.
Alberta Investment Mgmt.
AustralianSuper
B.C. Investment Mgmt. Corp
California Public Employees
Retirement System
Colorado PERA
Employees Retirement System of TX
First State Super
Folketrygdfondet
Första AP-fonden

Future Fund
GE Asset Mgmt.
Healthcare of Ontario Pension Plan
New York State Teachers'
Retirement Systems
North Carolina Retirement Systems
Ohio Public Employees Retirement
System
Oregon State Treasury
PGGM
PSERS - PA Public School EEs'
Retirement System

Shell Asset Mgmt.
State of Michigan Retirement System
State of Wisconsin Investment Board
State Teachers Retirement System of
Ohio
Teacher Retirement System of Texas
Texas Permanent School Fund
Texas Treasury Safekeeping Trust
Utah Retirement Systems
Virginia Retirement System
Washington State Investment Board

INSURANCE COMPANIES

AEGON
Aflac Global Investments
Allianz Global Investors
Allianz of America
Allstate Investments
American Family Insurance
General Re New England Asset Mgmt.
Generali Investments Europe
Genworth Financial
Guardian Life Insurance Co of America
Hartford Investment Mgmt. Co.
Legal and General Investment Mgmt.

Liberty Mutual Investments
Manulife Financial
Massachusetts Life Insurance Co.
MEAG Munich Ergo AssetManagement
MetLife
Mutual of America
Nationwide Life Insurance
Northwestern Mutual
Pacific Life Insurance
RGA Reinsurance
Sun Life Financial
Swiss Reinsurance Company

ASSET MANAGERS

AB
Aberdeen Asset Management
Acadian Asset Management
Advantus Capital Management
Alcentra
American Century Investments
Ameriprise
AMP Capital
Amundi Asset Management
Arch Capital Group
Ares Management
Ariel Investments
Aronson + Johnson + Ortiz
Artemis Investment Management
Aviva Investors North America
Babson Capital Management
Baillie Gifford & Co.
Bain Capital
Baring Asset Management
Baupost Group
Bessemer Trust Company
BlackRock
BlueBay Asset Management
BMO Asset Management (U.S.)
BNP Paribas
BNY Mellon
The Boston Company
Bracebridge Capital
Brandywine Global Investment Mgmt.

Brown Brothers Harriman
Calvert Investments
The Capital Group
Carmignac Gestion
Causeway Capital
CBRE Clarion
Center Square Investment Mgmt.
Challenger Limited
Clearbridge
Clifton Group
Columbia Threadneedle
Conning Asset Management
Credit Suisse Asset Management
Danske Capital
Delaware Investments
Deutsche Asset Management
Diamond Hill Capital Management
Dodge and Cox
DoubleLine
The Dreyfus Corporation
Dupont Capital Management
EACM Advisors
Eagle Asset Management
Eaton Vance
F&C Asset Management
Fiera Capital Corporation
First State Investments
Fisher Investments
Fonds de solidarité

Fort Washington Investment Advisors
Franklin Templeton
Galliard Capital Management
GoldenTree Asset Management
Goldman Sachs Asset Management
Grantham, Mayo, Van Otterloo & Co.
Gresham Investment Management
Greystone Managed Investments
Harbor Capital Advisors
Harris Associates
HSBC Global Asset Management
Income Research + Management
Intact Investment Management
Investec Asset Management
Invesco
Janus
Jennison Associates
John Hancock
JP Morgan Asset Management
Jupiter Asset Management Ltd
Kames Capital
Kayne Anderson Rudnick
Kempen Capital
Kleinwort Benson Investors Dublin
KLP Kapitalforvaltning
Korea Investment Corporation
LaSalle Investment Management
Legg Mason Global Asset Mgmt.
M&G Investments

Marathon Asset Management
Mellon Capital
Mondrian Investment Partners
Morgan Stanley Investment
Management
Newton
NISA Investment Advisers
Northern Trust Global Investments
Nuveen Investments
Och-Ziff Capital Management Group
Income Research + Management
Intact Investment Management
Investec Asset Management
Invesco
OppenheimerFunds
Osterweis Capital Management
PanAgora Asset Management
Parametric
Pareto Partners
Payden & Rygel
Permal
Perpetual Investment Management
Pictet & Cie
Pioneer Global Asset Management
Platinum Asset Management
PPM America
Principal Global Investors
Public Financial Management
Putnam Investments

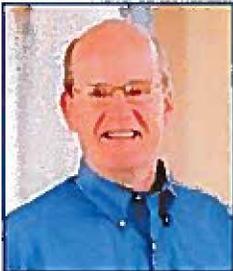
Quantitative Management Associates
RBC Global Asset Management
Robeco
Royal London Asset Management
RPMI Limited
Russell Investment Group
Sands Capital Management
Standish Mellon
State Street Global Advisors
Sterling Capital Management
Strategic Investment Group
T. Rowe Price
TCW Group
TD Asset Management
Thornburg Investment Management
TIAA
UBS Global Asset Management
The Vanguard Group
Vontobel Asset Management
Waddell & Reed Investment
Management
Walter Scott & Partners
Wasatch Advisors
Wells Capital Management
Western Asset Management
Westwood Holdings Group
The World Bank

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