



PARTNERING TO BUILD FINANCIAL SECURITY FOR MEMBERS AND THEIR FAMILIES

Follow-Up Materials from the Sept. 19th JAC Discussion

October 9th, 2018





Wyoming Retirement System

Partnering to Build Financial Security for Members and their Families

Matt Mead
Governor

Ruth Ryerson
Executive Director



October 9th, 2018

To: Senator Bruce Burns, Co-Chairman
Representative Bob Nicholas, Co-Chairman
CC: Members of the JAC
RE: Follow up materials from Sept. 19th JAC meeting

VIA EMAIL
C/O Legislative Service Office

Dear Committee Members:

The WRS Board appreciates the interest of the JAC in exploring a performance compensation program to assist us in attracting and retaining the best and brightest to WRS. We thank you for your continued interest, and look forward to answering any additional questions you may have in the upcoming meeting.

This memo provides WRS' responses to questions and data requested during the JAC meeting on September 19th.

Sincerely,

Laura Ladd,
Board Chair

/s/

Tom Chapman,
Investment Committee Chair

Ruth Ryerson,
Executive Director

Sam Masoudi,
Chief Investment Officer

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During the September 19th JAC meeting, Chairman Nicholas asked WRS and STO to provide responses to the following:

1. Provide a comparison of current salaries paid to investment staff, especially junior analysts, against the McLagan survey. Include both the 75% public pension comparator and 25% regional private sector comparator as well as the composite of the two with a comparison against your respective salaries for analyst, officer, senior analyst and CIO.

See Exhibit A for the relevant pages from the McLagan data included in the May 24th, 2018 report to Alaska. See Exhibit B for McLagan full universe data provided to WRS.

Salary (\$ in 000s)	Legal	Analyst/Sr Analyst	Investment Officer	SIO	CIO
Public Median - All Combined	\$187	\$91	\$171	\$222	\$332
Median-Primarily External	\$181	\$88	\$165	\$232	\$319
Median- Primarily Internal	\$256	\$95	\$178	\$200	\$387
Private (using Alaska McLagan Study)	NA	\$70	\$188	\$301	\$420
75% Public Median/25% Private Median¹	NA	\$86	\$175	\$242	\$354
WRS Actual	\$123	\$70	N/A	\$187	\$232
STO Actual		\$70	N/A	\$152	\$250

2. Offer any comments on the constitutionality of performance pay. Attached is LSO's opinion on this question.

WRS does not have anything to add to the state's opinion on the matter.

3. Provide a statistical analysis of other states' performance, net of fees, for those pension funds with internal investments or external investment management, and those with performance pay against those without performance pay.

It is not possible to isolate the impact of any one minor variable, such as internal investing or incentive compensation plans, on returns because there are so many other contributing interacting variables. As a

¹ The 75% Public Median/ 25% Private Median is a simple weighted average of the Public Median Combined amount provided by McLagan to WRS and the Private data from the McLagan presentation to Alaska Permanent Fund.

result, all efforts to find a correlation with fund return for either of the variables requested were inconclusive.

Internal Investing

Unequivocally, the overwhelming majority of investment returns is driven by the interaction and combination of two variables: asset allocation and manager selection, which are typically within the purview of the investment team. As a result, superior investment returns are mostly dependent on having a stable, experienced, talented investment team. While it is not possible to isolate the impact of having a team with these characteristics, it is reasonable to assume that the opposite of all of these characteristics would certainly not be desirable.

Asset allocation is the primary factor driving investment returns. Several academic studies have suggested that the impact could be as high as 85-95%. By definition, this would mean that internal investing could only impact a portion of the remaining 5-15%.

WRS was not able to determine the exact composition, performance, or the dollar value of the assets invested internally for many of the pensions. Among the plans that invest internally, performance correlations were statistically inconclusive over all time periods. The highest correlation was with the three-year period, which had a very low correlation of less than 0.09--meaning it explains less than 10% of the return variance. Over the last 1-, 3-, 5-, and 10-year periods, roughly an equal number of these plans outperformed and underperformed their peer funds' median returns, suggesting randomness of this variable. We have included the relevant responses to previous subcommittee inquiries showing both the return relationship as it relates to size, internal and CIO tenure within the entire universe of 72 pension plans (Appendix C) and for the smaller subset of pensions under \$20 B with internal management (Appendix D).

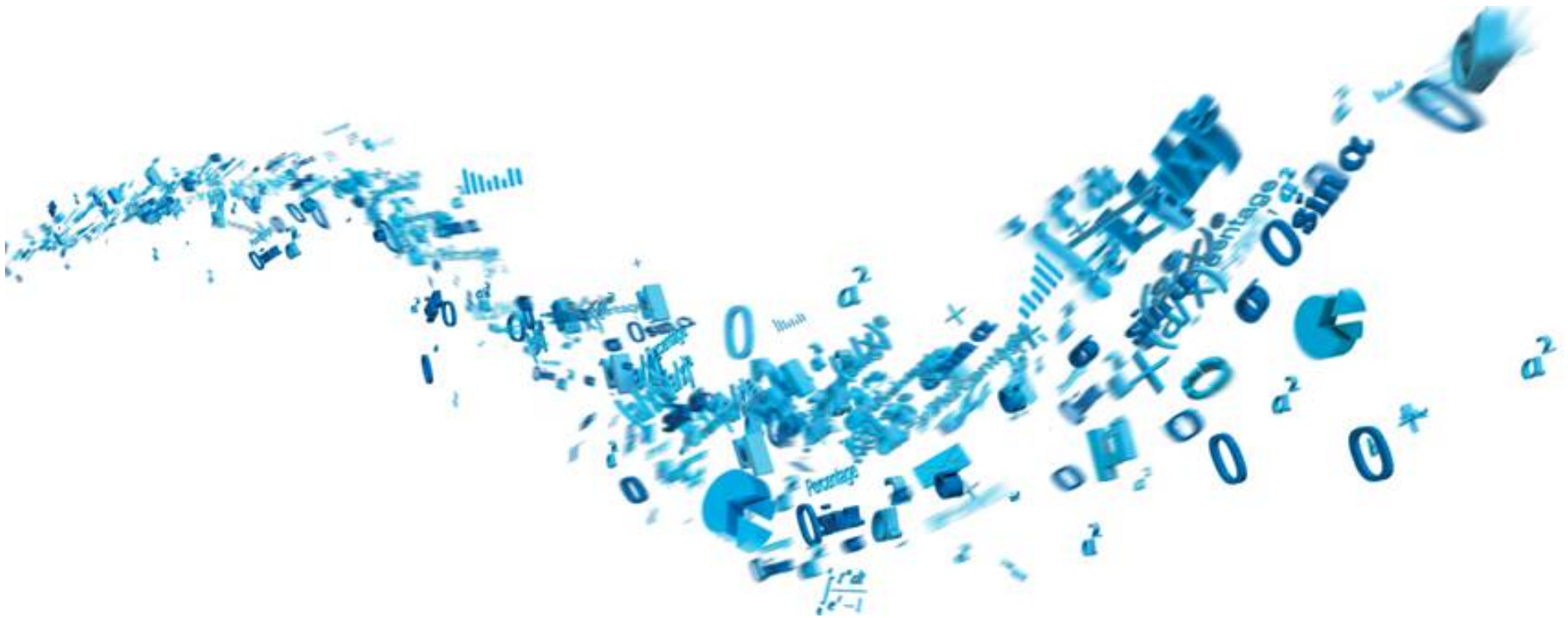
Incentive Compensation

A stable, experienced investment team is undoubtedly critical to producing superior investment returns. Providing competitive compensation is critical to building this type of team.

After reviewing annual reports, board minutes, and plan websites for the list of 72 pensions, we were not able to determine if there was a correlation between producing superior returns and having incentive compensation plans in place. This was due in part to not being able to determine whether these pensions have had incentive compensation plans in place, and if so, the plans' materiality, and when they became effective, rendering any analysis incomplete or potentially misleading. However, according to the McLagan report prepared for Alaska Permanent, as of May 2018, 75% of pensions used in their report and almost all private sector peers have incentive compensation programs, indicating they are becoming the market standard.

May 24, 2018

Survey Match	Competitive Market (Private Sector Firms)						Quartile Positioning	
	Salary			Total Cash				
	25th	Median	75th	25th	Median	75th	Salary	T. Cash
	Percentile		Percentile	Percentile		Percentile		
Management								
CIO	\$356	\$420	\$567	\$725	\$1,055	\$1,873	3	4
ED without CIO Resp	400	455	654	922	1,399	3,014	4	4
CLO	263	325	371	412	676	833	4	4
CFO	230	296	353	371	565	902	4	4
	\$1,248	\$1,496	\$1,944	\$2,429	\$3,694	\$6,622	4	4
	-10%	-25%	-42%	-54%	-70%	-83%		
Investments								
Hd of Inv Area - Fixed Income	\$225	\$278	\$350	\$473	\$619	\$965	2	4
Sr PM I - Fixed Income	200	217	250	341	416	535	1	4
Hd of Area/Asset Class - Real Estate	225	260	290	566	651	800	3	4
Sr PM I - Fixed Income	200	217	250	341	416	535	2	4
Hd of Area/Team Leader - Priv EQ	260	327	386	480	652	781	4	4
Hd of Area/Team Leader - EQ	248	312	375	360	424	573	4	4
Hd of Area/Team Leader - Priv EQ	260	327	386	480	652	781	4	4
Sr PM I - Real Estate	193	200	211	331	415	477	4	4
Sr Mgr / Sr PM I	166	188	219	258	301	405	3	4
Sr PM II - Fixed Income	141	169	199	216	271	358	2	4
Sr Risk/Inv Strat	140	171	205	179	258	345	3	4
Sr PM II - EQ	170	205	250	227	379	600	4	4
Sr PM II - EQ	170	205	250	227	379	600	4	4
Sr Port Analyst / Port Analyst	72	86	110	88	115	150	1	2
Sr Portfolio Analyst	80	100	140	109	151	200	2	3
Sr Portfolio Analyst	80	100	140	109	151	200	2	3
Sr Portfolio Analyst	80	100	140	109	151	200	2	3
Sr Port Analyst / Port Analyst	72	86	110	88	115	150	1	2
Interm Analyst - Ext Inv	63	70	80	63	77	88	1	2
Interm Analyst - Ext Inv	63	70	80	63	77	88	1	2
	\$3,108	\$3,688	\$4,420	\$5,108	\$6,668	\$8,831	3	4
	17%	-1%	-17%	-29%	-45%	-59%		



2018 McLagan Pension Funds Compensation Survey - US

All Participants

WYOMING RETIREMENT SYS

October 09, 2018

HIGHLY CONFIDENTIAL

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Prepared by McLagan
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2018 McLagan Pension Funds Compensation Survey - US (037) - Management Summary

Firm: Wyoming Retirement Sys
Market: All Participants
Currency: USD (000's)

	2017 TOTAL CASH						2017 TOTAL COMPENSATION						2018 SALARY					
	MARKET			WYOMING RETIREMENT SYS			MARKET			WYOMING RETIREMENT SYS			MARKET			WYOMING RETIREMENT SYS		
	LOW QUARTILE (25%)	MEDIAN (50%)	HIGH QUARTILE (75%)	MEDIAN (50%)	RANK OF FIRM'S MEDIAN	VARIANCE TO MEDIAN (50%)	LOW QUARTILE (25%)	MEDIAN (50%)	HIGH QUARTILE (75%)	MEDIAN (50%)	RANK OF FIRM'S MEDIAN	VARIANCE TO MEDIAN (50%)	LOW QUARTILE (25%)	MEDIAN (50%)	HIGH QUARTILE (75%)	MEDIAN (50%)	RANK OF FIRM'S MEDIAN	VARIANCE TO MEDIAN (50%)
01 - Overall Management																		
037-01-0100 Executive Director With or Without CIO Resp.	199.9	264.6	344.8	232.0	28 OF 47	<div></div>	209.2	264.6	359.0	232.0	29 OF 47	<div></div>	200.0	263.3	319.2	232.0	26 OF 41	<div></div>
037-01-0150 Executive Director With CIO Responsibilities	214.2	285.2	447.6	-	14	<div></div>	214.2	285.2	451.0	-	14	<div></div>	237.3	294.6	427.6	-	14	<div></div>
037-01-0200 Executive Director Without CIO Resp.	199.5	256.0	325.0	232.0	19 OF 33	<div></div>	212.3	256.0	325.0	232.0	20 OF 33	<div></div>	197.2	250.0	304.6	232.0	16 OF 27	<div></div>
037-01-0300 Chief Investment Officer	265.0	350.5	532.8	232.0	38 OF 44	<div></div>	265.0	370.1	542.1	232.0	38 OF 44	<div></div>	271.3	331.6	401.2	232.0	35 OF 41	<div></div>
037-01-0900 COO/CAO	140.2	195.2	258.6	-	24	<div></div>	140.2	195.2	258.6	-	24	<div></div>	144.3	185.7	212.3	-	20	<div></div>
35 - Manager-of-Managers/Manager Oversight																		
037-35-0400 Team Leader - External Inv All Spec. Comb.	193.8	257.5	357.6	189.0	26 OF 32	<div></div>	193.8	282.1	359.9	189.0	27 OF 32	<div></div>	191.4	222.2	260.0	189.0	22 OF 29	<div></div>
037-35-0450 Team Leader - External Inv Traditional Prod.	172.6	247.1	326.9	189.0	12 OF 18	<div></div>	184.1	247.1	326.9	189.0	13 OF 18	<div></div>	168.1	205.0	270.0	189.0	11 OF 16	<div></div>
037-35-0475 Team Leader - External Inv Alternative Prod.	219.4	257.5	372.6	-	25	<div></div>	220.6	287.7	398.9	-	25	<div></div>	199.5	224.6	251.9	-	23	<div></div>
037-35-0600 Sr Manager - External Inv All Spec. Comb.	150.7	182.5	283.3	189.0	13 OF 37	<div></div>	151.0	187.9	287.1	189.0	15 OF 37	<div></div>	150.0	171.0	204.8	189.0	8 OF 36	<div></div>
037-35-0800 Sr Analyst - External Inv All Spec. Comb.	103.7	122.9	176.4	-	36	<div></div>	103.9	122.9	185.0	-	36	<div></div>	101.2	120.0	138.9	-	35	<div></div>
037-35-0900 Int Analyst - External Inv All Spec. Comb.	81.5	91.6	108.7	-	21	<div></div>	81.8	91.6	109.4	-	21	<div></div>	82.4	91.4	106.8	-	22	<div></div>
73 - Finance & Accounting																		
037-73-0200 CFO/Head of Finance	124.5	161.6	199.3	-	28	<div></div>	124.5	161.6	199.3	-	28	<div></div>	124.9	167.2	186.1	-	25	<div></div>
79 - Legal																		
037-79-0200 Chief Legal Officer	132.9	192.9	274.9	122.2	27 OF 32	<div></div>	132.9	192.9	274.9	122.2	27 OF 32	<div></div>	136.2	187.2	237.5	122.2	26 OF 31	<div></div>

2018 McLagan Pension Funds Compensation Survey - US (037)

Firm:Wyoming Retirement Sys

Market:All Participants

Currency:USD (000's)

Function:Overall Management

Position:Chief Investment Officer

Position Code: 037-01-0300

	2017 TOTAL CASH								2017 TOTAL COMPENSATION						2018 SALARY									
	MARKET		MARKET			WYOMING RETIREMENT S			MARKET			WYOMING RETIREMENT S			MARKET			WYOMING RETIREMENT S						
	#	#	LOW QUARTILE (25%)	MEDIAN (50%)	HIGH QUARTILE (75%)	MEDIAN (50%)	VARIANCE TO MEDIAN -50% 0% 50%			LOW QUARTILE (25%)	MEDIAN (50%)	HIGH QUARTILE (75%)	MEDIAN (50%)	VARIANCE TO MEDIAN -50% 0% 50%			LOW QUARTILE (25%)	MEDIAN (50%)	HIGH QUARTILE (75%)	MEDIAN (50%)	VARIANCE TO MEDIAN -50% 0% 50%			
	FIRMS	INCS																						
Chief Investment Officer																								
037-01-0300 - Chief Investment Officer		43	46	265.0	350.5	532.8	232.0	<div></div>			265.0	370.1	542.1	232.0	<div></div>			271.3	331.6	401.2	232.0	<div></div>		
By the Fund's Bonus Practice																								
Non-Bonus Paying		20	22	242.9	286.4	352.8	232.0	<div></div>			242.9	286.4	352.8	232.0	<div></div>			257.4	286.5	364.5	232.0	<div></div>		
Bonus Paying		21	22	350.5	488.7	605.0	-	<div></div>			386.4	527.6	682.4	-	<div></div>			316.2	375.4	412.8	-	<div></div>		
By the Fund's Assets Under Management																								
Less than \$10 Billion		11	11	244.6	303.3	391.7	232.0	<div></div>			244.6	303.3	408.3	232.0	<div></div>			244.6	289.0	322.9	232.0	<div></div>		
\$10 - \$40 Billion		12	13	240.0	263.3	297.3	-	<div></div>			240.0	263.3	297.3	-	<div></div>			247.7	286.4	351.5	-	<div></div>		
\$40 Billion and Above		18	20	390.8	519.0	622.3	-	<div></div>			390.8	528.5	670.5	-	<div></div>			372.3	388.3	440.0	-	<div></div>		
By the Fund's Location																								
East		6	6	-	308.3	-	-	<div></div>			-	308.3	-	-	<div></div>			-	311.6	-	-	<div></div>		
Mid West		14	15	274.5	402.8	552.5	-	<div></div>			274.5	426.5	552.5	-	<div></div>			316.2	349.3	386.8	-	<div></div>		
South		7	8	-	316.1	-	-	<div></div>			-	316.1	-	-	<div></div>			-	353.0	-	-	<div></div>		
West		14	15	268.1	337.3	542.7	232.0	<div></div>			268.1	385.2	554.6	232.0	<div></div>			263.1	320.0	419.1	232.0	<div></div>		
By the Fund's Management Style																								
Primarily Internally Managed Assets		8	9	355.1	459.4	558.0	-	<div></div>			355.1	518.1	699.6	-	<div></div>			-	387.2	-	-	<div></div>		
Primarily Externally Managed Assets		33	35	249.4	330.0	528.5	232.0	<div></div>			249.4	330.0	528.5	232.0	<div></div>			263.1	319.2	390.0	232.0	<div></div>		

2018 McLagan Pension Funds Compensation Survey - US (037)

Firm:

Wyoming Retirement Sys

Market:

All Participants

Currency:

USD (000's)

Function:

Manager-of-Managers/Manager Oversight

Position:

Team Leader - Ext. Inv All Specializations Combined

Position Code:

037-35-0400

			2017 TOTAL CASH					2017 TOTAL COMPENSATION					2018 SALARY				
			MARKET			WYOMING RETIREMENT S		MARKET			WYOMING RETIREMENT S		MARKET			WYOMING RETIREMENT S	
			# FIRMS	# INCS	LOW QUARTILE (25%)	MEDIAN (50%)	HIGH QUARTILE (75%)	LOW QUARTILE (25%)	MEDIAN (50%)	HIGH QUARTILE (75%)	MEDIAN (50%)	VARIANCE TO MEDIAN -50% 0% 50%	LOW QUARTILE (25%)	MEDIAN (50%)	HIGH QUARTILE (75%)	MEDIAN (50%)	VARIANCE TO MEDIAN -50% 0% 50%
Team Leader - External Inv All Spec. Comb.																	
037-35-0400 - Team Leader - External Inv All Spec. Comb.	31	59	193.8	257.5	357.6	189.0	<div><div></div></div>	193.8	282.1	359.9	189.0	<div><div></div></div>	191.4	222.2	260.0	189.0	<div><div></div></div>
037-35-0501 - Team Leader - External Inv Equity	10	10	174.2	192.2	311.7	189.0	<div><div></div></div>	174.2	192.2	311.7	189.0	<div><div></div></div>	-	195.2	-	189.0	<div><div></div></div>
037-35-0502 - Team Leader - External Inv Fixed-Income	6	6	-	229.2	-	189.0	<div><div></div></div>	-	242.5	-	189.0	<div><div></div></div>	-	160.5	-	189.0	<div><div></div></div>
037-35-0503 - Team Leader - External Inv Real Estate	8	8	-	296.5	-	-	<div><div></div></div>	-	296.5	-	-	<div><div></div></div>	-	236.8	-	-	<div><div></div></div>
037-35-0504 - Team Leader - External Inv Hedge Funds	5	5	-	221.5	-	-	<div><div></div></div>	-	225.9	-	-	<div><div></div></div>	-	220.7	-	-	<div><div></div></div>
037-35-0505 - Team Leader - External Inv Priv. EQ/Venture	20	22	220.5	272.6	404.2	-	<div><div></div></div>	220.5	289.2	447.6	-	<div><div></div></div>	200.0	224.6	248.7	-	<div><div></div></div>
037-35-0509 - Team Leader - External Inv Generalist	7	8	-	291.4	-	-	<div><div></div></div>	-	291.4	-	-	<div><div></div></div>	-	234.4	-	-	<div><div></div></div>
By the Fund's Bonus Practice																	
Non-Bonus Paying	14	27	168.6	213.0	272.6	189.0	<div><div></div></div>	168.6	213.0	272.6	189.0	<div><div></div></div>	169.8	221.5	256.6	189.0	<div><div></div></div>
Bonus Paying	16	31	247.4	334.4	397.9	-	<div><div></div></div>	261.2	336.3	454.6	-	<div><div></div></div>	202.5	228.9	265.0	-	<div><div></div></div>
By the Fund's Assets Under Management																	
Less than \$10 Billion	-	-	-	-	-	189.0	<div><div></div></div>	-	-	-	189.0	<div><div></div></div>	-	-	-	189.0	<div><div></div></div>
\$10 - \$40 Billion	8	10	176.6	215.6	227.9	-	<div><div></div></div>	190.1	215.6	227.9	-	<div><div></div></div>	183.3	221.5	239.6	-	<div><div></div></div>
\$40 Billion and Above	18	42	214.7	298.0	382.6	-	<div><div></div></div>	214.7	298.0	406.6	-	<div><div></div></div>	199.7	228.9	280.6	-	<div><div></div></div>
By the Fund's Location																	
East	5	16	160.8	256.0	365.4	-	<div><div></div></div>	160.8	256.0	371.9	-	<div><div></div></div>	165.0	205.0	240.0	-	<div><div></div></div>
Mid West	7	12	217.4	278.6	321.9	-	<div><div></div></div>	217.4	278.6	321.9	-	<div><div></div></div>	192.2	220.0	234.4	-	<div><div></div></div>
South	6	9	221.5	257.5	293.0	-	<div><div></div></div>	221.5	257.5	293.0	-	<div><div></div></div>	200.0	221.8	234.3	-	<div><div></div></div>
West	12	21	207.4	287.7	360.8	189.0	<div><div></div></div>	213.0	291.6	373.1	189.0	<div><div></div></div>	220.0	280.6	326.7	189.0	<div><div></div></div>
By the Fund's Management Style																	
Primarily Internally Managed Assets	7	11	181.8	224.6	398.4	-	<div><div></div></div>	191.9	224.6	434.7	-	<div><div></div></div>	177.3	199.8	222.5	-	<div><div></div></div>
Primarily Externally Managed Assets	23	47	209.8	287.7	357.6	189.0	<div><div></div></div>	212.5	290.6	357.6	189.0	<div><div></div></div>	193.8	231.6	271.5	189.0	<div><div></div></div>

2018 McLagan Pension Funds Compensation Survey - US (037)

Firm:Wyoming Retirement Sys

Market:All Participants

Currency:USD (000's)

Function: Manager-of-Managers/Manager Oversight

Position: Senior Manager - External Investments - All Specializations Combined

Position Code: 037-35-0600

			2017 TOTAL CASH						2017 TOTAL COMPENSATION						2018 SALARY					
			MARKET			WYOMING RETIREMENT S			MARKET			WYOMING RETIREMENT S			MARKET			WYOMING RETIREMENT S		
			#	#																
			FIRMS	INCS	LOW QUARTILE (25%)	MEDIAN (50%)	HIGH QUARTILE (75%)	MEDIAN (50%)	VARIANCE TO MEDIAN -50% 0% 50%	LOW QUARTILE (25%)	MEDIAN (50%)	HIGH QUARTILE (75%)	MEDIAN (50%)	VARIANCE TO MEDIAN -50% 0% 50%	LOW QUARTILE (25%)	MEDIAN (50%)	HIGH QUARTILE (75%)	MEDIAN (50%)	VARIANCE TO MEDIAN -50% 0% 50%	
Sr Manager - External Inv All Spec. Comb.																				
037-35-0600 - Sr Manager - External Inv All Spec. Comb.	36	131	150.7	182.5	283.3	189.0				151.0	187.9	287.1	189.0		150.0	171.0	204.8	189.0		
037-35-0601 - Sr Manager - External Inv Equity	14	19	151.9	165.5	315.5	-				151.9	165.5	315.5	-		125.7	158.0	205.1	-		
037-35-0602 - Sr Manager - External Inv Fixed-Income	-	-	-	-	-	-				-	-	-	-		-	-	-	-		
037-35-0603 - Sr Manager - External Inv Real Estate	13	22	161.9	184.5	326.3	-				161.9	184.5	326.3	-		169.7	180.8	217.7	-		
037-35-0604 - Sr Manager - External Inv Hedge Funds	6	8	-	150.2	-	189.0				-	160.0	-	189.0		-	152.7	-	189.0		
037-35-0605 - Sr Manager - External Inv Priv. EQ/Venture	22	55	158.4	209.0	277.0	-				158.4	209.2	282.7	-		151.8	178.2	205.7	-		
037-35-0609 - Sr Manager - External Inv Generalist	14	24	135.8	176.2	280.9	-				135.8	176.2	326.6	-		146.0	166.9	203.0	-		
By the Fund's Bonus Practice																				
Non-Bonus Paying	19	62	126.5	152.6	169.4	189.0				126.5	152.6	169.4	189.0		131.4	156.4	177.6	189.0		
Bonus Paying	17	69	209.0	282.1	335.3	-				210.9	284.5	342.9	-		164.8	183.1	224.0	-		
By the Fund's Assets Under Management																				
Less than \$10 Billion	6	10	157.1	193.2	280.0	189.0				161.7	202.3	280.0	189.0		152.8	160.6	173.7	189.0		
\$10 - \$40 Billion	10	24	122.0	149.1	161.7	-				122.0	149.4	172.5	-		128.0	152.2	161.0	-		
\$40 Billion and Above	20	97	158.4	209.0	317.2	-				158.4	209.0	324.8	-		152.8	181.2	218.1	-		
By the Fund's Location																				
East	8	31	130.9	165.5	183.2	-				130.9	165.5	183.2	-		126.6	164.8	181.5	-		
Mid West	11	32	144.9	175.1	269.1	-				144.9	175.1	269.1	-		141.5	154.0	170.0	-		
South	7	21	150.4	187.9	278.4	-				157.0	202.1	324.8	-		150.0	160.3	196.0	-		
West	10	47	173.5	232.7	328.9	189.0				179.4	266.2	328.9	189.0		181.9	213.6	231.1	189.0		
By the Fund's Management Style																				
Primarily Internally Managed Assets	8	44	166.6	208.9	267.6	-				169.7	223.7	282.1	-		155.2	178.2	184.5	-		
Primarily Externally Managed Assets	28	87	140.3	175.6	302.2	189.0				140.3	180.1	312.9	189.0		148.6	164.9	217.2	189.0		

2018 McLagan Pension Funds Compensation Survey - US (037)

Firm:Wyoming Retirement Sys

Market:All Participants

Currency:USD (000's)

Function: Manager-of-Managers/Manager Oversight

Position: Intermediate Analyst - External Investments - All Specializations Combined

Position Code: 037-35-0900

	2017 TOTAL CASH							2017 TOTAL COMPENSATION							2018 SALARY						
	MARKET		MARKET			WYOMING RETIREMENT S			MARKET			WYOMING RETIREMENT S			MARKET			WYOMING RETIREMENT S			
	#	#	LOW	MEDIAN	HIGH	MEDIAN	VARIANCE		LOW	MEDIAN	HIGH	MEDIAN	VARIANCE		LOW	MEDIAN	HIGH	MEDIAN	VARIANCE		
	FIRMS	INCS	QUARTILE	(50%)	QUARTILE	(50%)	TO MEDIAN		QUARTILE	(50%)	(75%)	(50%)	TO MEDIAN		QUARTILE	(50%)	(75%)	(50%)	TO MEDIAN		
			(25%)		(75%)		-50% 0% 50%		(25%)				-50% 0% 50%		(25%)				-50% 0% 50%		
Int Analyst - External Inv All Spec. Comb.																					
037-35-0900 - Int Analyst - External Inv All Spec. Comb.	21	80	81.5	91.6	108.7	-			81.8	91.6	109.4	-			82.4	91.4	106.8	-			
037-35-0901 - Int Analyst - External Inv Equity	6	9	83.9	95.2	104.0	-			83.9	95.2	104.0	-			81.1	88.1	95.2	-			
037-35-0902 - Int Analyst - External Inv Fixed-Income	-	-	-	-	-	-			-	-	-	-			-	-	-	-			
037-35-0903 - Int Analyst - External Inv Real Estate	5	19	86.9	91.6	107.1	-			86.9	91.6	107.1	-			-	-	-	-			
037-35-0904 - Int Analyst - External Inv Hedge Funds	5	5	-	94.3	-	-			-	94.3	-	-			-	89.0	-	-			
037-35-0905 - Int Analyst - External Inv Priv. EQ/Venture	11	26	78.2	89.1	103.4	-			79.0	89.1	103.4	-			78.6	88.4	110.8	-			
037-35-0909 - Int Analyst - External Inv Generalist	12	17	81.4	84.9	103.0	-			81.4	84.9	114.5	-			81.7	86.6	91.4	-			
By the Fund's Bonus Practice																					
Non-Bonus Paying	12	30	84.9	102.0	131.0	-			84.9	102.0	131.0	-			84.1	94.3	142.5	-			
Bonus Paying	8	47	79.2	85.3	100.4	-			80.1	88.1	100.4	-			80.5	89.1	99.2	-			
By the Fund's Assets Under Management																					
Less than \$10 Billion	-	-	-	-	-	-			-	-	-	-			-	-	-	-			
\$10 - \$40 Billion	-	-	-	-	-	-			-	-	-	-			-	-	-	-			
\$40 Billion and Above	14	69	82.7	91.6	108.5	-			82.7	91.6	109.2	-			83.8	92.5	106.8	-			
By the Fund's Location																					
East	6	11	89.3	104.0	132.0	-			89.3	104.0	132.0	-			80.6	89.3	121.8	-			
Mid West	6	9	75.9	78.7	96.2	-			75.9	78.7	96.2	-			-	84.9	-	-			
South	-	-	-	-	-	-			-	-	-	-			-	-	-	-			
West	5	46	83.8	91.2	112.1	-			83.8	91.2	112.1	-			85.0	95.2	108.1	-			
By the Fund's Management Style																					
Primarily Internally Managed Assets	4	-	-	-	-	-			-	-	-	-			84.3	95.2	106.8	-			
Primarily Externally Managed Assets	16	47	81.2	95.2	116.9	-			81.6	95.2	116.9	-			80.8	88.0	122.2	-			

2018 McLagan Pension Funds Compensation Survey - US (037)

Firm:

Wyoming Retirement Sys

Function:

Legal

Position Code:

037-79-0200

Market:

All Participants

Position:

Chief Legal Officer

Currency:

USD (000's)

	2017 TOTAL CASH								2017 TOTAL COMPENSATION						2018 SALARY									
	MARKET		MARKET			WYOMING RETIREMENT S			MARKET			WYOMING RETIREMENT S			MARKET			WYOMING RETIREMENT S						
	#	#	LOW QUARTILE (25%)	MEDIAN (50%)	HIGH QUARTILE (75%)	MEDIAN (50%)	VARIANCE TO MEDIAN -50% 0% 50%			LOW QUARTILE (25%)	MEDIAN (50%)	HIGH QUARTILE (75%)	MEDIAN (50%)	VARIANCE TO MEDIAN -50% 0% 50%			LOW QUARTILE (25%)	MEDIAN (50%)	HIGH QUARTILE (75%)	MEDIAN (50%)	VARIANCE TO MEDIAN -50% 0% 50%			
	FIRMS	INCS																						
Chief Legal Officer																								
037-79-0200 - Chief Legal Officer		31	32	132.9	192.9	274.9	122.2	<div></div>			132.9	192.9	274.9	122.2	<div></div>			136.2	187.2	237.5	122.2	<div></div>		
By the Fund's Bonus Practice																								
Non-Bonus Paying		12	12	132.9	178.1	216.8	122.2	<div></div>			132.9	178.1	216.8	122.2	<div></div>			132.9	168.2	208.6	122.2	<div></div>		
Bonus Paying		17	18	144.0	205.7	280.2	-	<div></div>			144.0	205.7	327.9	-	<div></div>			142.3	230.0	276.8	-	<div></div>		
By the Fund's Assets Under Management																								
Less than \$10 Billion		5	6	-	142.9	-	122.2	<div></div>			-	142.9	-	122.2	<div></div>			-	138.3	-	122.2	<div></div>		
\$10 - \$40 Billion		9	9	134.6	147.3	180.7	-	<div></div>			134.6	147.3	180.7	-	<div></div>			134.6	154.7	184.3	-	<div></div>		
\$40 Billion and Above		15	15	196.9	274.1	371.9	-	<div></div>			196.9	274.1	392.4	-	<div></div>			193.5	240.3	277.1	-	<div></div>		
By the Fund's Location																								
East		5	5	-	186.9	-	-	<div></div>			-	186.9	-	-	<div></div>			-	180.7	-	-	<div></div>		
Mid West		10	11	115.8	138.1	189.0	-	<div></div>			115.8	138.1	189.0	-	<div></div>			113.6	141.5	197.2	-	<div></div>		
South		5	5	-	281.2	-	-	<div></div>			-	294.3	-	-	<div></div>			-	226.8	-	-	<div></div>		
West		9	9	190.1	209.0	277.2	122.2	<div></div>			190.1	209.0	277.2	122.2	<div></div>			-	216.8	-	122.2	<div></div>		
By the Fund's Management Style																								
Primarily Internally Managed Assets		7	7	-	274.1	-	-	<div></div>			-	274.1	-	-	<div></div>			-	256.0	-	-	<div></div>		
Primarily Externally Managed Assets		22	23	131.3	180.7	219.0	122.2	<div></div>			131.3	180.7	219.0	122.2	<div></div>			136.2	181.2	219.4	122.2	<div></div>		

Appendix C - Statistical Summary of NASRA Peer Data

Size vs. Return

There is a **slight correlation**, in the sample that WRS collected, of larger funds performing better than smaller funds. While the correlations are not statistically significant, over the 3-, and 5-year periods, larger funds exhibited slightly higher returns than smaller funds on average (36% and 17%, respectively). Over the 1-, and 10-year periods there was close to zero correlation and the 10-year was slightly negative (1.8% and -3.2%, respectively). The sample size for the 1-, 3-, 5-, and 10-year periods is 48, 48, 48, and 37.

Internal vs. Return

Of the sample that WRS collected, 54% (13/24), 63% (15/24), 58% (14/24), and 45% (9/20) of those funds who manage internally had a return greater than median for the 1-, 3-, 5-, and 10-year periods, respectively. The percent of funds that manage their funds strictly externally with returns greater than average for the 1-, 3-, 5-, and 10-year periods were 46% (11/24), 38% (9/24), 42% (10/24), and 53% (9/17), respectively. The average returns for funds that manage internally were 12.9%, 5.8%, 9.2%, and 5.2% for the 1-, 3-, 5-, and 10-year periods, respectively. The average returns for funds that manage externally were 12.6%, 5.3%, 8.9%, and 5.5% for the 1-, 3-, 5-, and 10-year periods, respectively. This doesn't take into effect size of funds or the degree of active with internal funds. Overall, **the results are mixed and largely inconclusive**.

CIO tenure vs. Return

While it is hard to draw conclusions from the sample that WRS collected, funds with longer CIO tenures had a **slight** positive correlation with the better quartiles. For the 1-, 3-, 5-, and 10-year periods, the correlation between CIO tenure and quartile were 9.6%, 38.5%, 21.3%, and 17.7%, respectively. The median CIO tenure for the sample of 43 was 7.5 years, and the average was 8.6 years. There are 43 observations for 1-, 3-, and 5-year periods. There are 33 observations for the 10-year correlation.

Appendix D - Excerpt from Previous Responses to Subcommittee

Overview

WRS values the JAC's support over the years in building out our investment program, which has been an important contributor to safeguarding and maximizing the value of plan assets. Stability of our investment team is key to a successful investment program, and the WRS Board appreciates the interest of the JAC in exploring a performance compensation program to assist us in attracting and retaining the best and brightest to WRS. Our partnership with the University of Wyoming through our internship program has allowed us to hire the next generation of smart young professionals to provide us with bench strength for the future. We thank you for your continued interest in the WRS investment program, and look forward to our upcoming meeting.

Purpose of the Report

This report was created to respond to the JAC Subcommittee #2's follow-up questions from the meeting in Casper on 8/17/2018.

a. Provide performance statistics for the "smaller" statewide pension funds with some internal management identified by the Subcommittee, and draw any conclusions.

Using the data we have collected on all public plans included in the NASRA data set provided by LSO, the eight plans with internal management that were selected by the Subcommittee slightly underperformed the peer set for the 3-, 5-, and 10-year periods.

The amount of internal management is only one of many variables that can impact fund performance, and its impact could be positive or negative. Several other variables contribute to divergence in returns over time, the most impactful of which is asset allocation. Other variables include: active vs. passive management; CIO/staff tenure; maturity of private investments program; resources available to staff; location (staffing, access to managers, ease of travel); complexity; and size of plan. Because of the myriad of variables at play, it is not possible to draw any conclusion based on any one variable in isolation.

The following table shows return quartiles (quartile "1" represents the best performance quartile) of the eight public plans the subcommittee identified with assets under \$20 billion that manage a portion of their assets in-house. Returns are as of the most recent period for which comparable information is available (June 30, 2017). Performance quartile breakpoints are based on the NASRA list of public plans provided by LSO. In the table below, "Internal Management Type" categorizes the types of internal management by complexity and alpha (outperformance) potential. While there is not a large enough sample size to draw conclusions, WRS' analysis

indicates there is no statistically significant relationship between internal management and 10-year returns. Internal management definitions:

- “Passive” - Replicating a benchmark such as the S&P without any modification.
- “Semi-Passive” - Replicating a benchmark but making adjustments to modify exposure to factors such as “value” and “growth”, in an attempt to outperform the benchmark. This is generally done by licensing a proprietary “factor” benchmark from a provider and following their suggested rebalance trades. This strategy does not involve fundamental analysis of individual securities.
- “Active” - Selecting individual securities such as stocks and bonds, based on time-intensive fundamental analysis. This approach can lead to returns that vary greatly from a given benchmark. Active management risk is typically greater than that of passive investing.

As of 6/30/17			Quartile Rank				Returns (Sorted by 10-Year)					Internal Management Type		
Fund	Assets (\$ B)	CIO Tenure (Years; as of ~2017)	1-Year	3-Year	5-Year	10-Year	1-Year	3- Year	5-Year	10-Year	% Internal	Passive	Semi-Passive	Active
MO LAGERS	\$7.0	12	3	4	2	1	12.0%	4.5%	9.3%	6.2%	18%	x	x	
SD RS	\$11.6	12	1	2	1	1	13.8%	6.0%	11.1%	6.1%	75%			x
LA SERS	\$11.0	20	1	4	3	2	15.8%	4.7%	9.0%	5.6%	32%	x		
NM ERB	\$12.23	10	3	2	3	3	12.0%	6.1%	8.7%	5.2%	33%			x
MI MERS	\$10.0	15	2	1	3	3	13.2%	7.5%	8.7%	5.0%	34%	x	x	x
AK PERS	\$17.8	15	2	3	2	3	13.4%	5.3%	9.2%	5.0%	15%	x	x	
KY RS	\$3.5	4	2	4	4	4	13.5%	4.8%	8.1%	4.9%	18%	x	x	
AZ PSPRS	\$7.6	13	4	3	4	4	11.9%	5.3%	8.0%	4.0%	9%			x
Average	\$10.1	13	2	3	3	3	13.2%	5.5%	9.0%	5.2%				
NASRA Peer Average	\$43.5	9					12.8%	5.6%	9.1%	5.3%				
Difference from NASRA							0.4%	-0.1%	-0.1%	-0.1%				

Note: 1st quartile is the highest returning quartile. Quartile cutoffs and peer average refer to NASRA peer set as of 6/30/17. AK PERS is \$17.8 bn, but the other pooled investments account for an additional \$14 bn in assets.

It is impossible to determine the impact of any one variable, such as percentage of assets managed internally, on overall fund performance, because there are so many other relevant variables and multicollinearity. The vast majority of performance variability between plans is determined by asset allocation. A smaller portion is due to a variety of other factors such as the decision to allocate more or less to active versus passive mandates, which is referred to as “active risk” i.e. owning a unique set of individual stocks compared to the benchmark such as the S&P 500. Once that decision is made, the implementation decision of whether to invest that mandate internally to save fees or execute through external managers can result in differing outcomes.

Active risk results in higher risk, relative to the benchmark, but is the only way to outperform the benchmark. Of the plans identified by the Subcommittee, only two of them have mandates that provide the potential to outperform their benchmarks substantially via active risk; South Dakota Retirement System (SD RS) and Michigan Municipal Employees’ Retirement System (MI MERS). The remaining plans identified by the Subcommittee have varying degrees of active risk, but to a much lesser degree than SD RS and MI MERS, and therefore their returns are largely attributable to asset allocation. Please see Appendix A for a conceptual diagram of the degree of internal fee savings versus the difficulty to implement; and Appendix B for a summary of variables tested using the NASRA universe to determine a possible correlation with returns.