12th Annual
EMERGING ISSUES FORUM

Revisiting the Pension Crisis
Looking Back and Looking Forward

James Lamenzo, Actuary | PERAC
John Boorack, Senior Actuarial Associate | PERAC

Hogan Conference Center
College of the Holy Cross, Worcester, MA

September 15, 2016

PERAC
PUBLIC EMPLOYEE RETIREMENT ADMINISTRATION COMMISSION

COMMONWEALTH OF MASSACHUSETTS
Public Employee Retirement Administration Commission
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EMERGING ISSUES FORUM

Revisiting the Pension Crisis

Looking Back and Looking Forward

James Lamenzo | Actuary

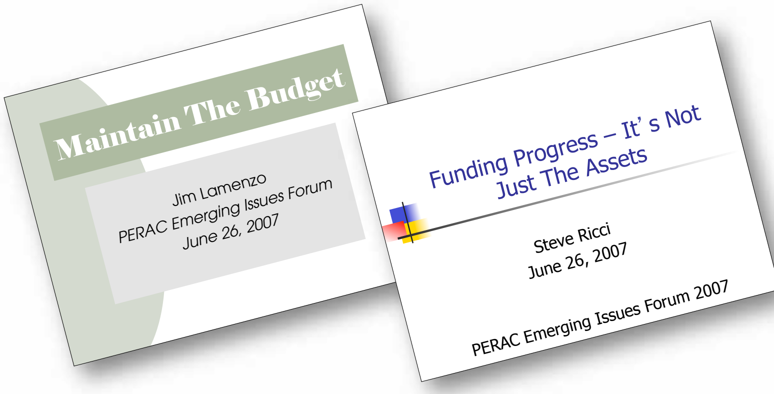
John Boorack | Senior Actuarial Associate

PERAC

September 15, 2016

2007 Emerging Issues Forum

- The National Pension Crisis
  - Maintain the Budget
  - Funding Progress — It's Not Just the Assets



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2011 Emerging Issues Forum

- Is the Sky Really Falling?

3

NOTES:

Five Years Later…

- Increasing unfunded liabilities
- Decreasing funded ratios

	2011	Current
Aggregate Unfunded Liability	$30.9 Billion	$51.0 Billion
Aggregate Funded Ratio	72.5%	58.4%

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What's Happened Since 1999?

	2001	2011	Current
Aggregate Unfunded Liability	$8.9 Billion	$30.9 Billion	$51.0 Billion
Aggregate Funded Ratio	82.8%	72.5%	58.4%

- 2000-2015 an extended period, not just a blip
- 2001 figures reflect primarily 1999 and 2000 valuations

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NOTES:

What's Happened Since 1999? *(continued)*

- Market run up 1985-1999
  - No articles on plan sustainability etc.
- Funded ratios generally top out in 2000
  - "too much too soon"
- 2000-2002 losses
  - Negative articles begin
- 2003-2007
  - Double digit returns each year (PRIT)
  - A few positive articles in 2007
- 2008 - disastrous year

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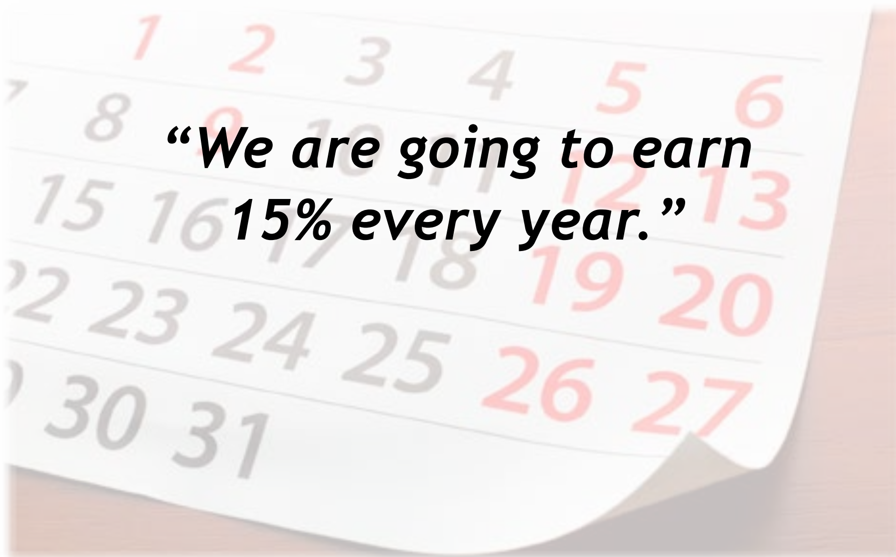
Optimism — 1999



"We are going to earn 15% every year."

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NOTES:

Optimism — Early 2002

"Well, we have had two bad years in a row, we can't have a third."

- But we did…
  - 2002 PRIT Return **(8.9%)**

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Optimism Continues

- Double digit returns 2003-2007
- But clouds on the horizon
  - Both local and national
    - Concerns with 2028 schedule
    - Losses exacerbated near end of schedule
  - National Pension Crisis – 2007 Emerging Issues presentation
    - Numerous media articles beginning 2002

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NOTES:

Optimism Turns to Pessimism

- 2008 Unprecedented loss
  - From a pension funding perspective
- 2008 forced our hand
  - Actuarial Advisory Committee
    - Schedules allowed to be extended, but responsibly
    - If extend beyond 2030
      - No reduction in appropriation until fully funded

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Why Maintain the Budget?

- Allow systems to weather storms
- Flexibility
- Always harder to increase (than decrease) the budget
- More important than ever
  - Past is "water under the bridge"

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NOTES:

Why Maintain the Budget? *(continued)*

- Best funded systems have consistently maintained budgeted amounts
  - Avoid cutbacks
  - 4% - 5% annual increases
  - Adjust amortization period as needed
  - Requires long-term fiscal discipline

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What Do We Mean By Cutbacks?

- Appropriation reduction from prior <u>year</u>
  - Uncommon event
- Reductions from prior **<u>schedule</u>**
  - More subtle reductions

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NOTES:

Examples of Reductions From Prior Schedule

Fiscal Year	2014 Valuation Schedule	2016 Valuation Schedule
2015	1,000	
2016	1,100	
2017	1,200	1,150
2018	1,300	1,250
2019	1,400	1,350

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Examples of Reductions From Prior Schedule *(continued)*

Fiscal Year	2014 Valuation Schedule	2016 Valuation Schedule
2015	1,000	
2016	1,100	
2017	1,200	1,200
2018	1,300	1,250
2019	1,400	1,350

2016 revised schedule maintains FY17 amount from 2014 schedule

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NOTES:

Other Historical Reductions
(Or Plan Changes With No Increase in Schedule)

- Home Rule Petitions
- Cost of benefits minimums
- ERI
- COLA (1997)
- COLA base changes
- Pension holiday

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Funding Schedule Approvals With Caveats

- More frequent in past 10 years
- Schedule reductions
- Assumptions
  - Investment return
  - Salary increase
  - Mortality

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NOTES:

Long-Term Fiscal Discipline

- Reviewed each schedule adopted by each system
  - State, Teachers, counties, cities, and towns
- **Every** system at least one reduction
  - Demonstrates difficulty of maintaining budget

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Long-Term Fiscal Discipline *(continued)*

- Most systems have multiple reductions
  - Some in 1990s
  - Some in 2000s
  - Often small but can add up
  - Some significant reductions

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NOTES:

Long-Term Fiscal Discipline
(continued)

- Schedule reductions not the only measure
- 21 systems with least number of and/or lowest amount of reductions
  - 14 above 70% funded
  - 17 above 65% funded
  - 20 above 60% funded
  - 13 funding completed by FY30

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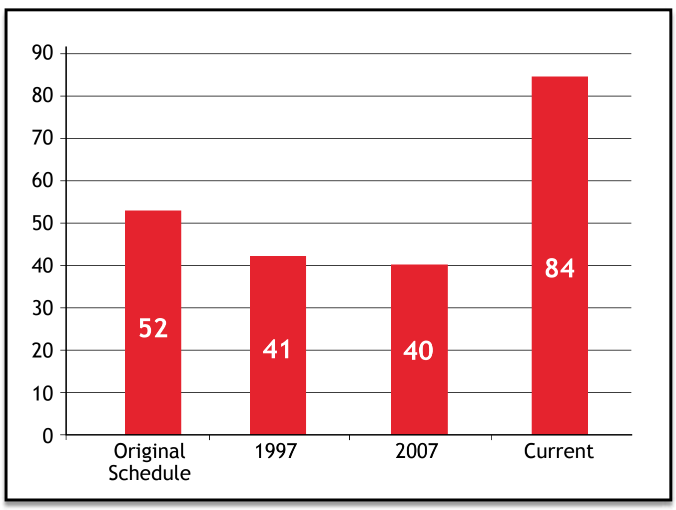
Number of Funding Schedules to 2028 (or beyond)



NOTE: Original, 1997, and 2007 figures reflect 2028 minimum schedule

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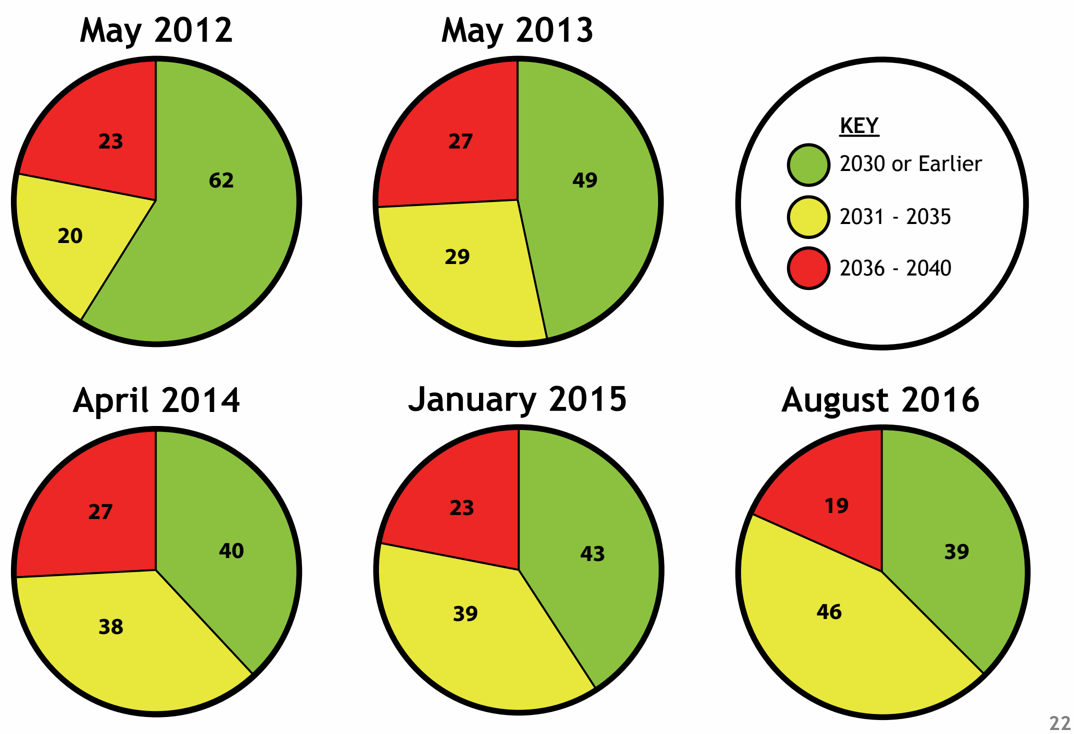
NOTES:

Recent Funding Schedules Adopted



NOTES:

Comparison of Funded Ratios

Funded Ratios	1987	1998	2000	2007	Current
>90%	3	9	12	8	2
80%-90%	1	7	11	10	6
70%-80%	1	11	26	21	22
60%-70%	2	43	35	36	27
50%-60%	3	29	18	20	28
40%-50%	25	7	4	10	18
30%-40%	59			1	0
<30%	12				1

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Cumulative Comparison of Funded Ratios

Funded Ratios	1987	1998	2000	2007	Current
>90%	3	9	12	8	2
>80%	4	16	23	18	8
>70%	5	27	49	39	30
>60%	7	70	84	75	57
>50%	10	99	102	95	85
>40%	35	106	106	105	103
>30%	94			106	103
All	106				104

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NOTES:


TOWN OF MILO
Established
1887
In Dog We Trust
MASSACHUSETTS

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Town of Milo | Actuarial Valuation Notes

- Valuations performed every 2 to 3 years
  - Only every four years shown
- 1988 – Initial valuation
- Amalgamation of systems
  - Add any number of zeros for comparability
  - Market value until 2000 then 5 year smoothed actuarial value

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Town of Milo | Actuarial Valuation Notes *(continued)*

Year	Plan Amendments	Investment Return Assumption	Mortality Assumption	Market Value Return
1988		8.25%	GAM - 1971	
1992		8.25%	GAM - 1971	10.6%
1996	1992 ERI	8.25%	GAM - 1971	11.0%
2000	COLA	8.00%	GAM - 1983	18.3%
2004	2002 ERI	8.00%	RP - 2000	1.9%
2008		8.00%	RP - 2000	13.9%
2012	$14,000 COLA Base	7.75%	RP – 2000 projected 10 years	(1.5%)
2016	Chapter 176	7.50%	RP – 2000 generational	9.4%

NOTES:
- $30,000 cap removed as of 1/1/88
- Market Value Return reflects the average annual return for the four previous years
- Experience Study released in 2003

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NOTES:

Town of Milo — Actual Results

Year	Actuarial Liability	Actuarial Value of Assets	Unfunded Actuarial Liability	Funded Ratio
1988	$16,000	$6,000	$10,000	38%
1992	20,800	11,000	9,800	53%
1996	27,300	18,000	9,300	66%
2000	42,000	33,500	8,500	80%
2004	55,000	38,000	17,000	69%
2008	67,000	45,300	21,700	68%
2012	87,000	49,400	37,600	57%
2016	108,500	58,800	49,700	54%

NOTES:

1. Through 2000, the actuarial value of assets was the market value.
2. 2004 MVA = $35,200; 2008 MVA = $49,800; 2012 MVA = $44,900; 2016 MVA = $57,650

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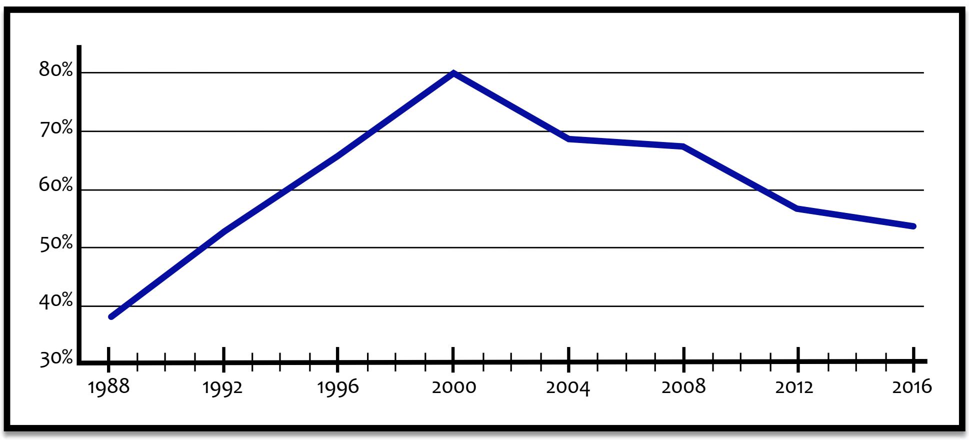
Town of Milo — Funded Ratio



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NOTES:

Let's Not Forget Progress 1988-2000

Year	Actuarial Liability	Actuarial Value of Assets	Unfunded Actuarial Liability	Funded Ratio
1988	$16,000	$6,000	$10,000	38%
2000	$42,000	$33,500	$8,500	80%

- UAL decreased modestly (dollar basis)
  - Expected to increase based on schedule
- Funded ratios increased significantly
  - "Too much too soon"
- Actuarial liability increased 2.6 times
- Assets increased 5.6 times

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Observations 2000-2016

- Unfunded Liability (UAL) has increased significantly
- Funded ratio has decreased significantly

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NOTES:

Why?

- Actual investment return
- Assumption changes
- Plan changes
- Reductions in funding schedule amounts
- Extension of funding schedule beyond 2030
- Cash flow

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NOTES:

Town of Milo — Investment Returns

Year	PRIT
1985	22.8%
1986	19.9%
1987	3.3%
1988	13.4%
1989	17.9%
1990	(2.3%)
1991	14.7%
1992	4.8%
1993	16.3%
1994	0.4%
1995	24.1%
1996	16.9%
1997	18.4%
1998	14.8%
1999	23.3%

Year	PRIT
2000	(1.2%)
2001	(5.3%)
2002	(8.9%)
2003	26.3%
2004	14.5%
2005	12.7%
2006	16.7%
2007	11.9%
2008	(29.5%)
2009	17.6%
2010	13.6%
2011	0.2%
2012	13.9%
2013	15.2%
2014	8.2%
2015	1.1%

Town of Milo — Average Investment Returns

- 1985-1999: 13.6%
- 2000-2015: 5.8%
- 1985-2015: 9.5%

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1988 – What Did We Expect?

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NOTES:

Projection of Plan Liabilities From 1988

- Reviewed each actuarial valuation 1988-2016
  - Determined percentage increase in expected liability one year later
  - Interpolated between valuations
  - Accounted for cash flow changes over time

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Projection of Assets From 1988

- Reviewed each actuarial valuation 1988-2016
  - Assumed investment return assumption met each year
  - Estimated cash flow for the year
    - Employer and employee contributions
    - Benefit payments
    - Assumed 4.5% increasing amortization to FY28
  - Determined percentage increase in assets one year later
  - Interpolated between valuations

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NOTES:

Town of Milo — Projected Valuation Results

Year	Actuarial Liability	Assets	Unfunded Actuarial Liability	Funded Ratio
1988	$15,875	$5,862	$10,013	36.9%
1989	17,138	6,794	10,344	39.6%
1990	18,502	7,800	10,702	42.2%
1991	19,974	8,919	11,055	44.7%
1992	21,492	10,106	11,386	47.0%
1993	23,061	11,349	11,712	49.2%
1994	24,687	12,620	12,067	51.1%
1995	26,365	13,945	12,420	52.9%
1996	28,079	15,326	12,753	54.6%
1997	29,883	16,782	13,101	56.2%
1998	31,915	18,362	13,553	57.5%
1999	34,184	20,079	14,105	58.7%
2000	36,679	22,027	14,652	60.1%
2001	39,430	24,252	15,178	61.5%
2002	42,449	26,830	15,619	63.2%
2003	45,335	29,245	16,090	64.5%
2004	48,064	31,449	16,615	65.4%
2005	50,899	33,776	17,123	66.4%
2006	53,846	36,235	17,611	67.3%
2007	56,862	38,772	18,090	68.2%
2008	59,930	41,348	18,582	69.0%
2009	63,107	44,036	19,071	69.8%
2010	66,384	46,845	19,539	70.6%
2011	69,769	49,749	20,020	71.3%
2012	73,235	52,761	20,474	72.0%
2013	76,604	55,715	20,889	72.7%
2014	79,937	58,591	21,346	73.3%
2015	83,335	61,521	21,814	73.8%
2016	86,749	64,464	22,285	74.3%

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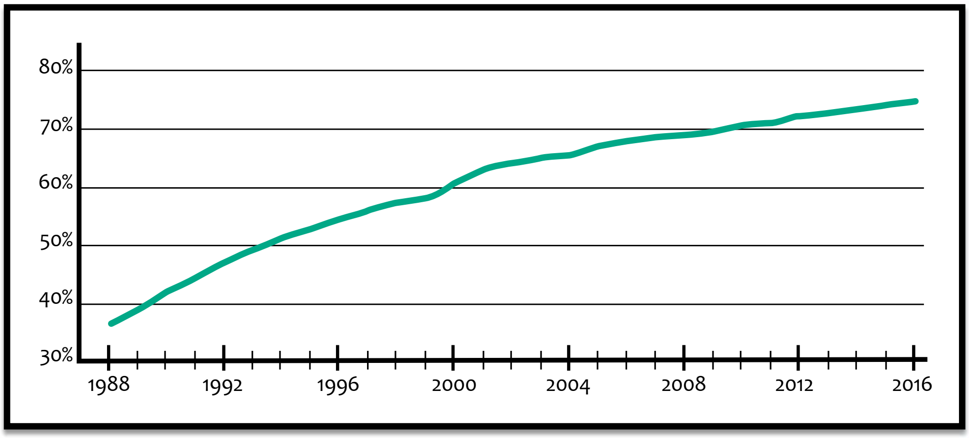
Town of Milo — Projected Funded Ratio



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Surprising Result!

- Expected a different shaped curve
  - Flatter at start
  - Increasing more rapidly later

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NOTES:

It’s the Cash Flow

- Town of Milo – positive cash flow in early years
  - Employer and employee contributions greater than benefit payments
  - Generates faster asset growth in early years
    - Therefore, initial funded ratios increase more rapidly
- Cash flow changed over time
  - Benefit payments now exceed employer and employee contributions

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What If Milo’s Initial Cash Flow Was Negative?

- Adjusted benefit payments to create initial negative cash flow
- Shape of curve what we expected

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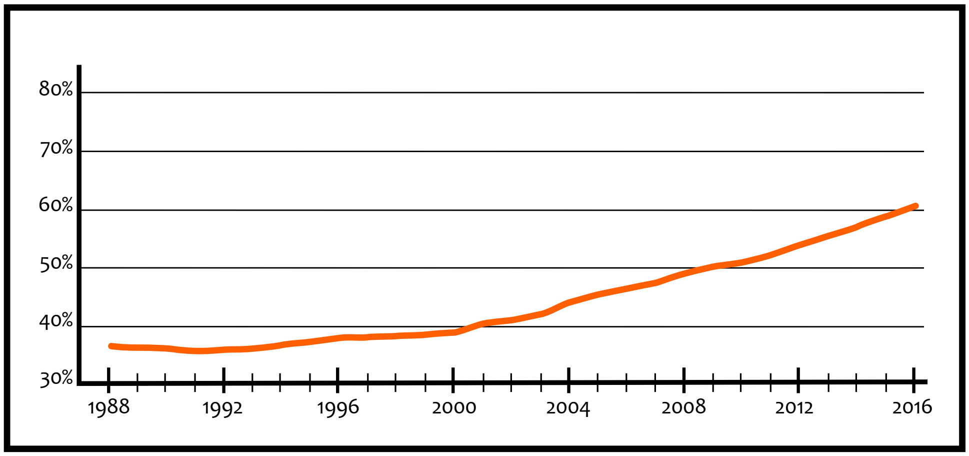
NOTES:

Town of Milo — Projected Funded Ratio (Negative Cash Flow)

Year	Actuarial Liability	Assets	Unfunded Actuarial Liability	Funded Ratio
1988	$15,875	$5,862	$10,013	36.9%
1989	17,138	6,305	10,833	36.8%
1990	18,502	6,781	11,721	36.7%
1991	19,974	7,293	12,681	36.5%
1992	21,492	7,861	13,631	36.6%
1993	23,061	8,498	14,563	36.9%
1994	24,687	9,214	15,473	37.3%
1995	26,365	9,960	16,405	37.8%
1996	28,079	10,737	17,342	38.2%
1997	29,883	11,536	18,347	38.6%
1998	31,915	12,401	19,514	38.9%
1999	34,184	13,365	20,819	39.1%
2000	36,679	14,542	22,137	39.6%
2001	39,430	15,967	23,463	40.5%
2002	42,449	17,684	24,765	41.7%
2003	45,335	19,408	25,927	42.8%
2004	48,064	21,135	26,929	44.0%
2005	50,899	22,995	27,904	45.2%
2006	53,846	24,999	28,847	46.4%
2007	56,862	27,124	29,738	47.7%
2008	59,930	29,375	30,555	49.0%
2009	63,107	31,755	31,352	50.3%
2010	66,384	34,268	32,116	51.6%
2011	69,769	36,975	32,794	53.0%
2012	73,235	39,880	33,355	54.5%
2013	76,604	42,871	33,733	56.0%
2014	79,937	45,984	33,953	57.5%
2015	83,335	49,295	34,040	59.2%
2016	86,749	52,804	33,945	60.9%

Town of Milo — Projected Funded Ratio (Negative Cash Flow) *(continued)*



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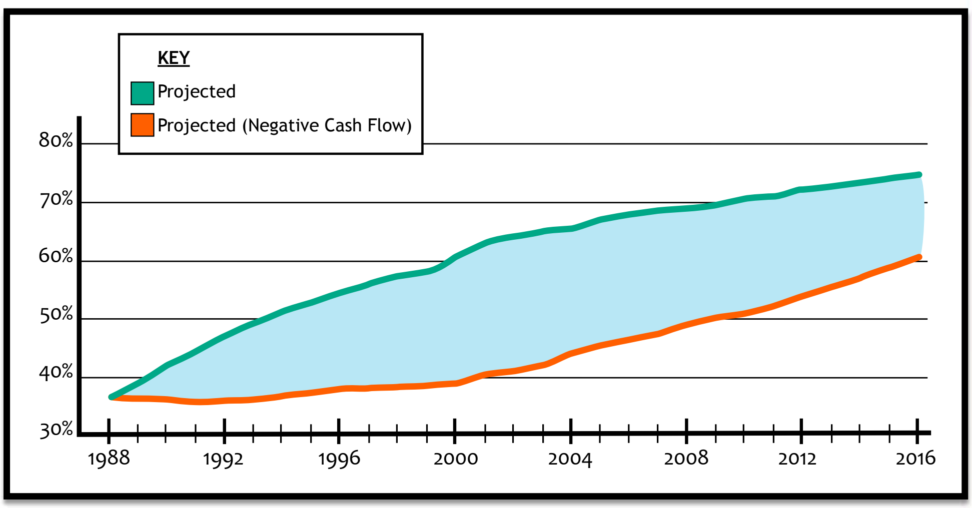
Town of Milo — Projected Funded Ratio Range



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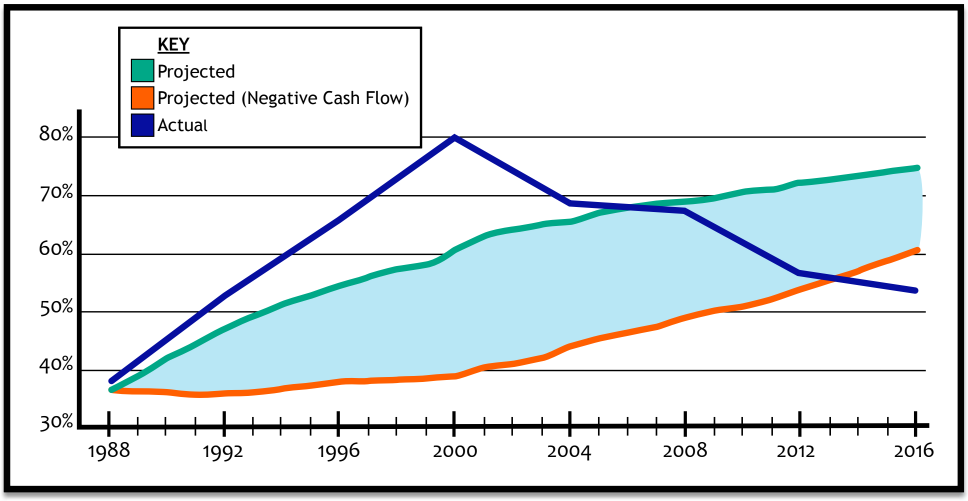
NOTES:

Town of Milo — Funded Ratios



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Observations

- January 1, 2000 funding well ahead of schedule
- 2000-2015 regress to the mean (or worse)!
  - “What have you done for me lately?”
  - Lost sight of 2000 progress (“ancient history”)
- BUT the 1988 projection does **<u>not</u>** reflect assumption and plan changes
  - Estimated impact on liability 25%-30%

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NOTES:

January 1, 2016 Valuation Results

	Actual	Adjusted*
Actuarial Liability	$108,500	$83,500 – $86,800
Assets	$58,800	$58,800
Funded Ratio	54.2%	67.7% - 70.4%

*Reflects actual without historical plan and assumption changes.
Assets may be somewhat lower to reflect a different funding pattern.

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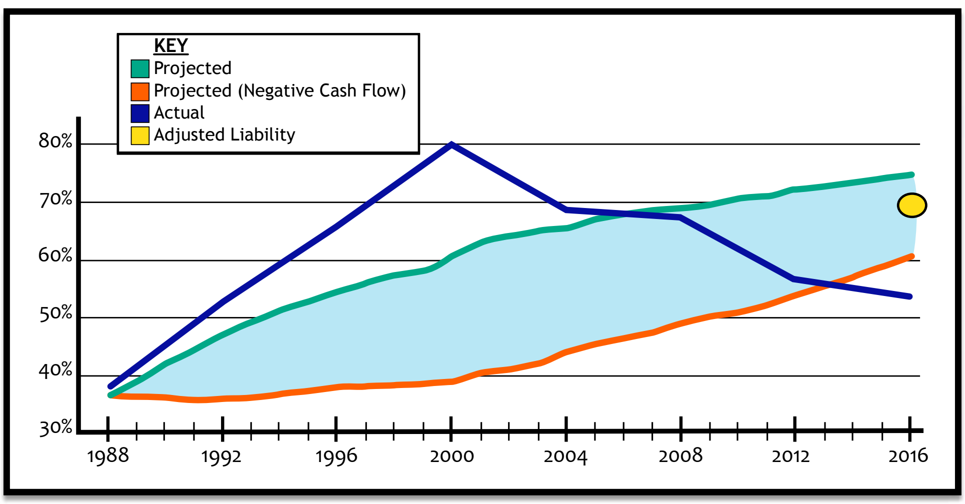
Town of Milo — Funded Ratios



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NOTES:

Town of Milo — Investment Returns 2000-2015

Year	PRIT
2000	(1.2%)
2001	(5.3%)
2002	(8.9%)
2003	26.3%
2004	14.5%
2005	12.7%
2006	16.7%
2007	11.9%
2008	(29.5%)
2009	17.6%
2010	13.6%
2011	0.2%
2012	13.9%
2013	15.2%
2014	8.2%
2015	1.1%
AVERAGE 2000-2015	**5.8%**

Town of Milo — Investment Returns 2000-2015 *(continued)*

- Average Annual Return of 5.8%
  - Generates loss on Market Value Basis
- If assumption met each year
  - 2016 assets would be $12M—$16M greater

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NOTES:

January 1, 2016 Valuation Results

	Actual	Adjusted*
Actuarial Liability	$108,500	$108,500
Assets	$58,800	$70,800 – $74,800
Funded Ratio	54.2%	65.3% - 68.9%

*Reflects actual assets assuming investment return assumption met since 2000.

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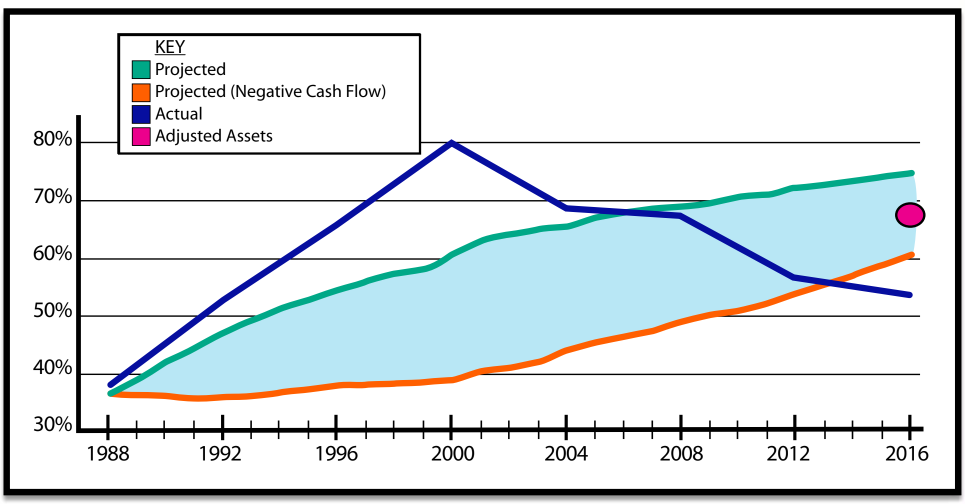
Town of Milo — Funded Ratios



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NOTES:

January 1, 2016 Valuation Results

	Actual	Adjusted*
Actuarial Liability	$108,500	$83,500 – $86,800
Assets	$58,800	$70,800 - $74,800
Funded Ratio	54.2%	81.5% - 89.6%

*Reflects actual liability without historical plan and assumption changes.
Reflects actual assets assuming investment return assumption met since 2000.
Assets may be somewhat lower to reflect a different funding pattern.

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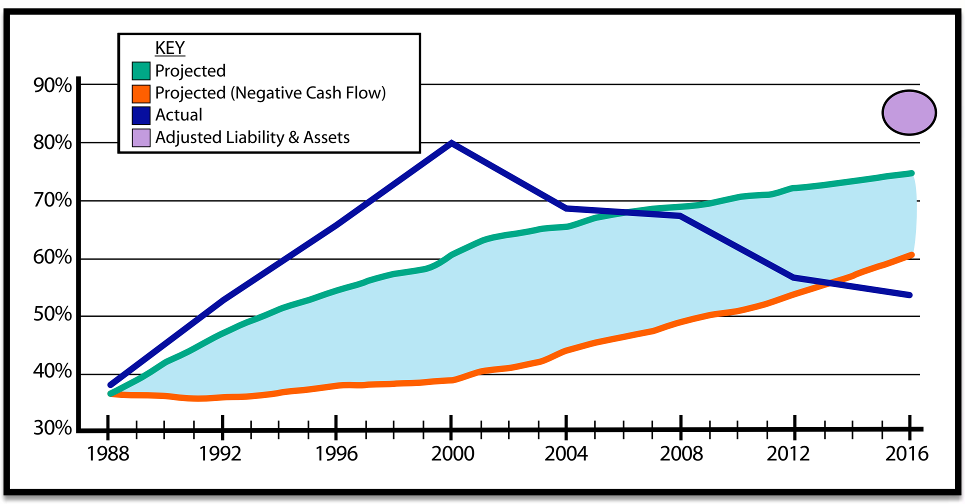
Town of Milo — Funded Ratios



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NOTES:

Looking Forward

- Projections to 2026
  - Assume annual return = 7.5%
  - Assume annual return = 4.0%
    - Less optimistic projection
    - Reflects adjusted appropriations based on FY36 schedule

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NOTES:

Town of Milo — Projected to 2026

Year	Actuarial Liability	Actuarial Value of Assets	Unfunded Actuarial Liability	Funded Ratio
2016	$108,500	$58,800	$49,700	54%
2018	117,200	66,700	50,500	57%
2020	126,300	77,200	49,100	61%
2022	135,900	89,400	46,500	66%
2024	145,900	103,400	42,500	71%
2026	156,400	119,400	37,000	76%

NOTES:

1. Assumes annual investment return equal to 7.50% each year.
2. Assumes no changes in assumptions or plan provisions.

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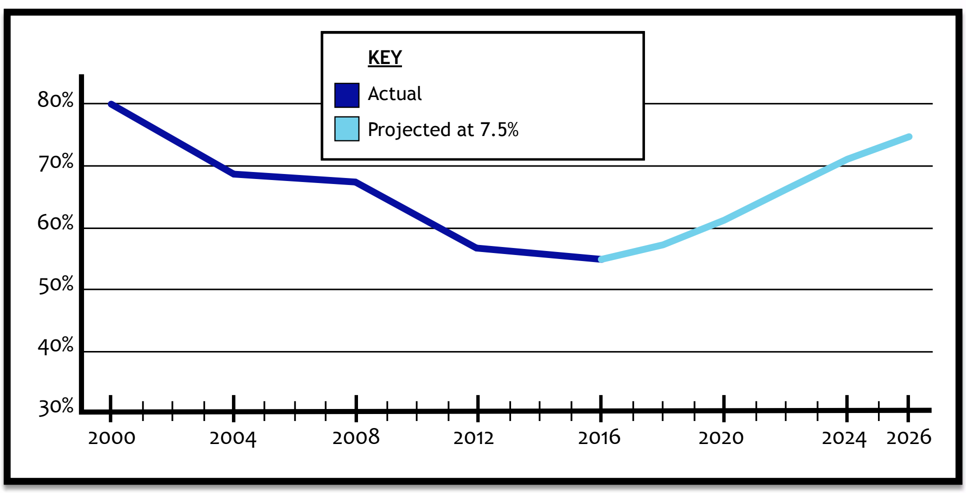
Town of Milo — Funded Ratio



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NOTES:

Town of Milo — Projected to 2026

Year	Actuarial Liability	Actuarial Value of Assets	Unfunded Actuarial Liability	Funded Ratio
2016	$108,500	$58,800	$49,700	54%
2018	117,200	57,600	59,600	49%
2020	126,300	62,500	63,800	49%
2022	135,900	70,100	65,800	52%
2024	145,900	79,400	66,500	54%
2026	156,400	90,700	65,700	58%

NOTES:
1. Assumes annual investment return equals 4.0% each year.
2. Assumes no changes in assumptions or plan provisions.

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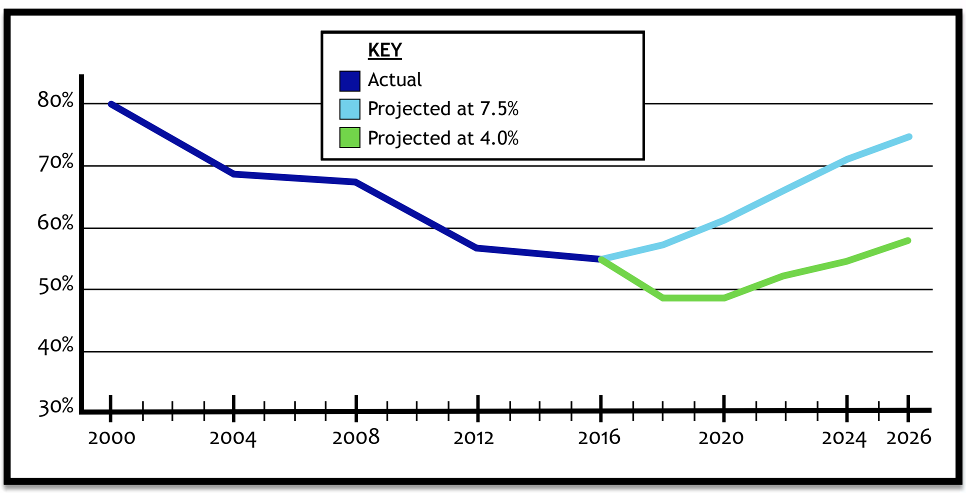
Town of Milo — Funded Ratio



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NOTES:

What Have We Learned?

- Uphill climb
  - Difficult to overcome 50 years of little or no employer funding
  - Long-term plan
- Investment returns matter
  - 1990's created a false sense of security
    - Subsequent volatility "hurt" more
- Progress has been made
  - Look at **entire** funding period
  - But plan and assumption changes have had an impact
- Reasons for optimism
  - More aggressive funding
  - More conservative assumption sets

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What Have We Learned? *(continued)*

- Hindsight is 20/20
  - Appropriation reductions were common
- Maintaining the budget still critical
  - Long-term fiscal discipline is key
  - Funding schedule strategy
    - 2014 Valuation – develop schedule (FY15 - FY17)
    - 2016 Valuation – develop schedule
      - Maintain (at least) FY17
      - Maintain (recommend) FY18 and FY19

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NOTES:

NOTES:

12th Annual EMERGING ISSUES FORUM

AGENDA

September 15, 2016

8:15	**REGISTRATION DESK OPENS**
9:00-9:15	**Opening Remarks** • Joseph E. Connarton | Executive Director | PERAC
9:15-10:15	**Other Post Employment Benefits** **> Trusting Your Trust Fund** • Mark D. Abrahams, President | The Abrahams Group **> PERAC Oversight of OPEB** • James Lamenzo, Actuary | PERAC
10:15-10:30	**BREAK**
10:30-12:30	**Disability Retirement** **> 10:30 - 12:00 | Everything You Wanted to Know About Disability Retirement** • Kate Hogan, Manager of Medical Services | PERAC • Judith Corrigan, Deputy General Counsel | PERAC • Patrice Looby, Nurse Case Manager | PERAC **> 12:00-12:30 | PTSD and the Status of the Field** • Terence M. Keane, Ph.D., Dir. of National Center for PTSD-Behavioral Sciences Division and Assoc. Chief of Staff for Research & Development at VA Boston
12:30	**Keynote Speaker** • Dolores Mitchell Retired Executive Director | Group Insurance Commission
12:45-1:15	**BUFFET LUNCH**
1:15-3:00	**Revisiting the Pension Crisis** ***(Looking Back and Looking Forward)*** • James Lamenzo, Actuary | PERAC • John Boorack, Senior Actuarial Associate | PERAC
3:00	**FORUM ENDS**

PUBLIC EMPLOYEE RETIREMENT ADMINISTRATION COMMISSION PERAC