Portland's Asset Management Program: Benchmarking and Progress in Business Practices

Jeff Leighton

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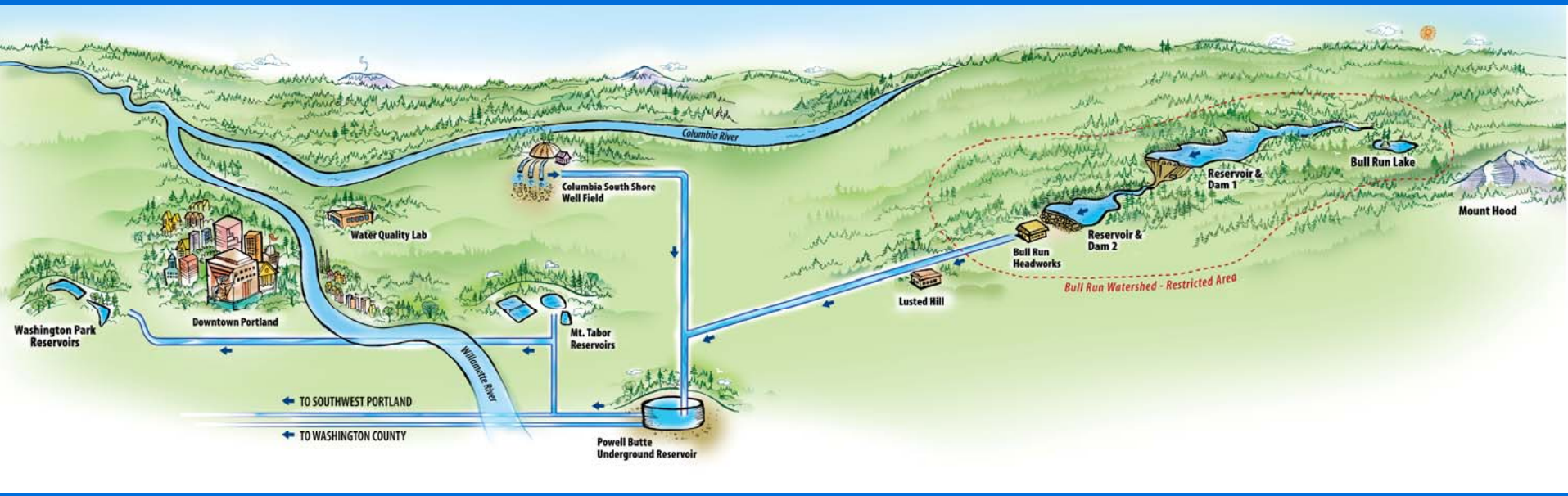
Retail and wholesale water supply in Oregon



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Let's start with definitions

Asset Management

- implementing a number of key business practices or processes
- a mindset or a way of doing business to help a utility manage risk, meet customer service expectations and become more efficient

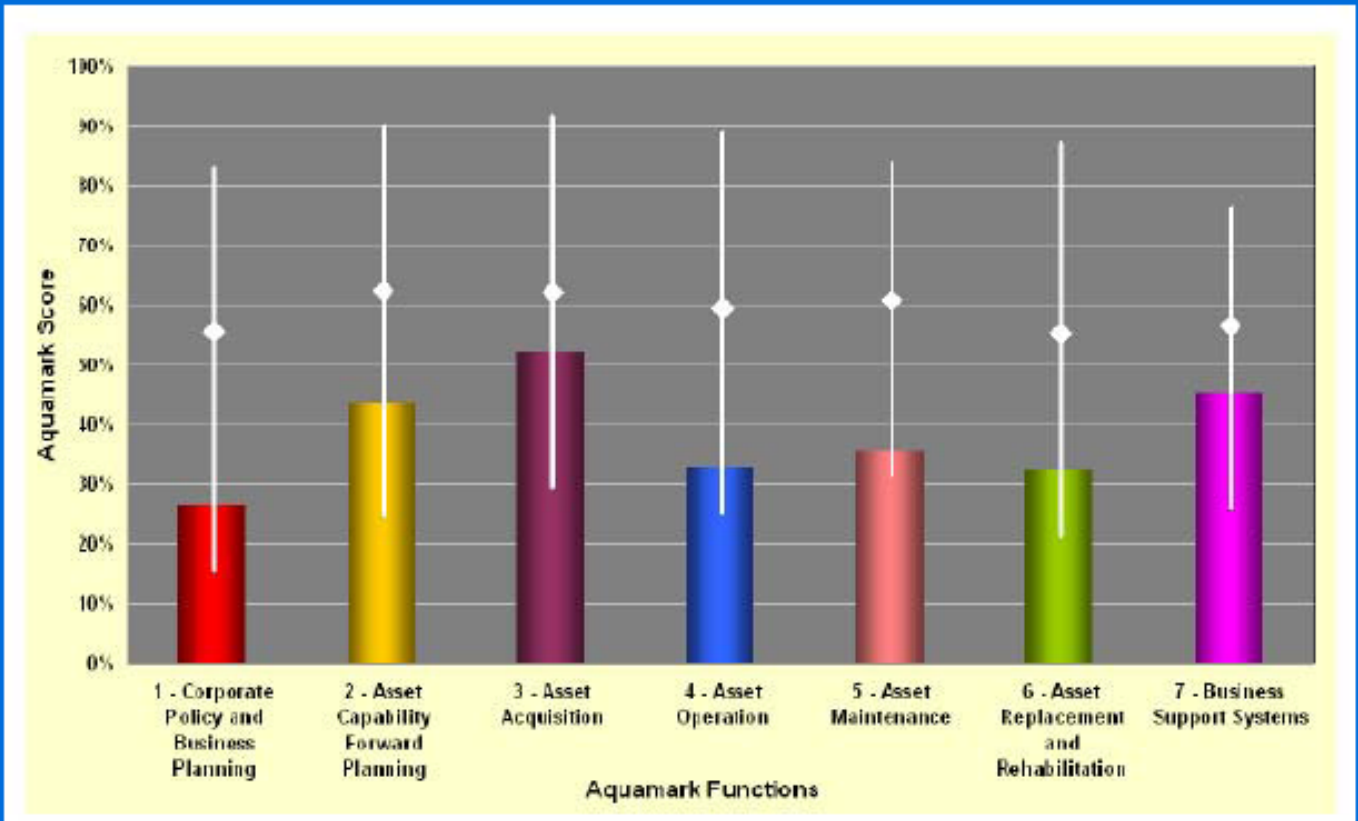
Benchmarking

- a tool for performance improvement through systematic search and adaptation of leading practices

Benchmarking Efforts

- Business Process “Gap Analysis”, 2005 and 2008
- Process Benchmarking Study, 2008
- Performance Benchmarking, Key Service Level Targets, 2009

2008 Process Benchmarking with WSAA



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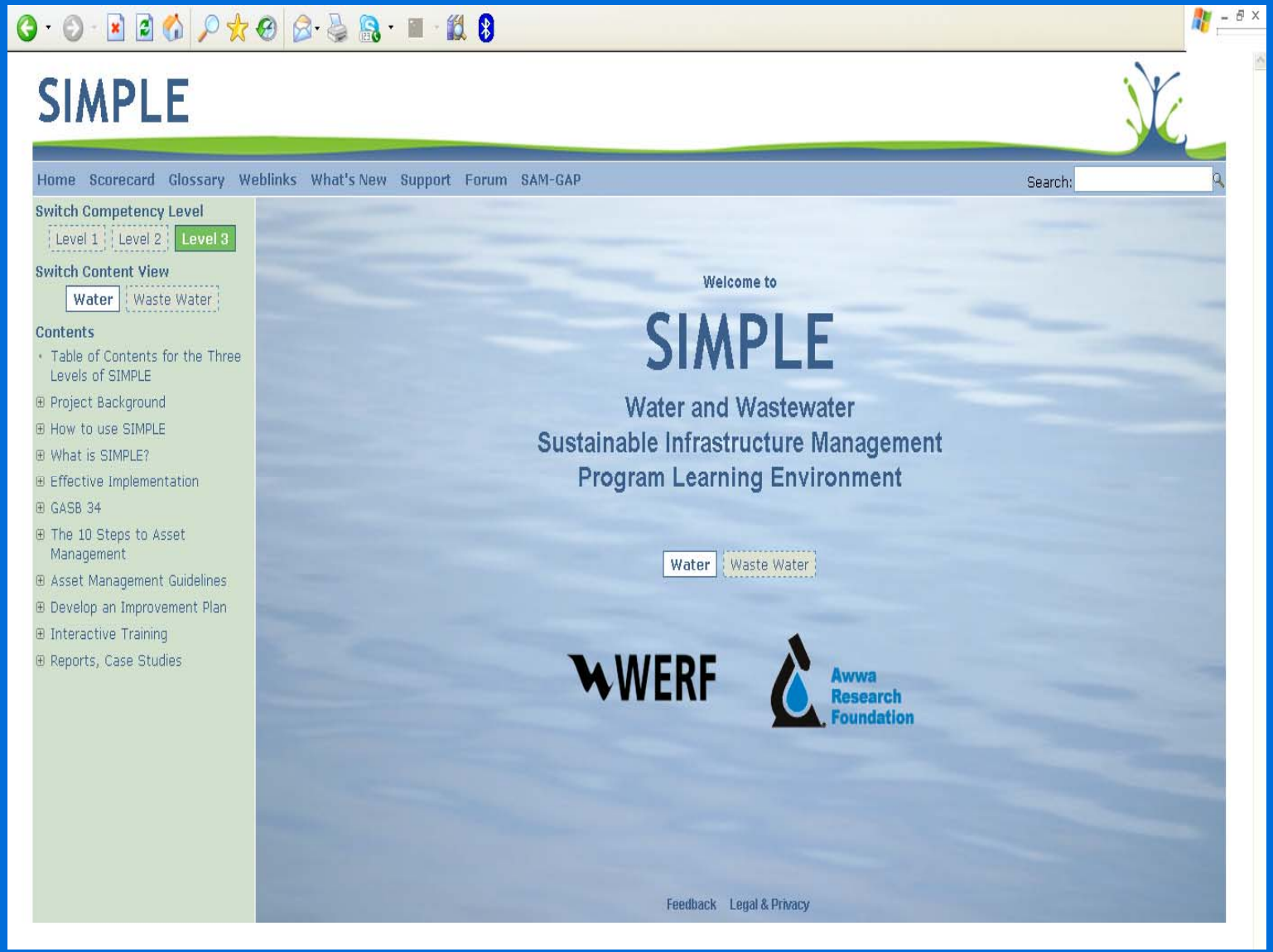
Business Process – Gap Analysis



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1 Processes and Practices

Asset management is ultimately about the effective management of the entire
practices must be in place that supports decision-making throughout all stages

Processes and Practices | Information Systems | Data and Knowledge | Service Delivery

1.01 Demand Analysis

Identify strategies to align demand for a service with an organization's capacit

1.01 | 1.02 | 1.03 | 1.04 | 1.05 | 1.06 | 1.07 | 1.08 | 1.0

Legend: Current Item | Uncompleted Item | Completed Item | Unanswered Ques

To what extent and at what level do processes exist for:

Level of practice

0 1 2 3 4 5

0 = "Innocence",
1 = Aware but no practice,
2 = Low practice level,
3 = Modest practice level,
4 = Substantial practice level,
5 = "World class" practice level

Extent of practice

0 1 2 3 4 5

0 = Never done,
1 = Ad hoc process rarely executed,
2 = Ad hoc process occasionally executed,
3 = Mixture of ad hoc and systematic process, partially documented,
4 = Mostly systematic process, pretty well documented, and regularly executed,
5 = Systematic, fully documented process, always executed

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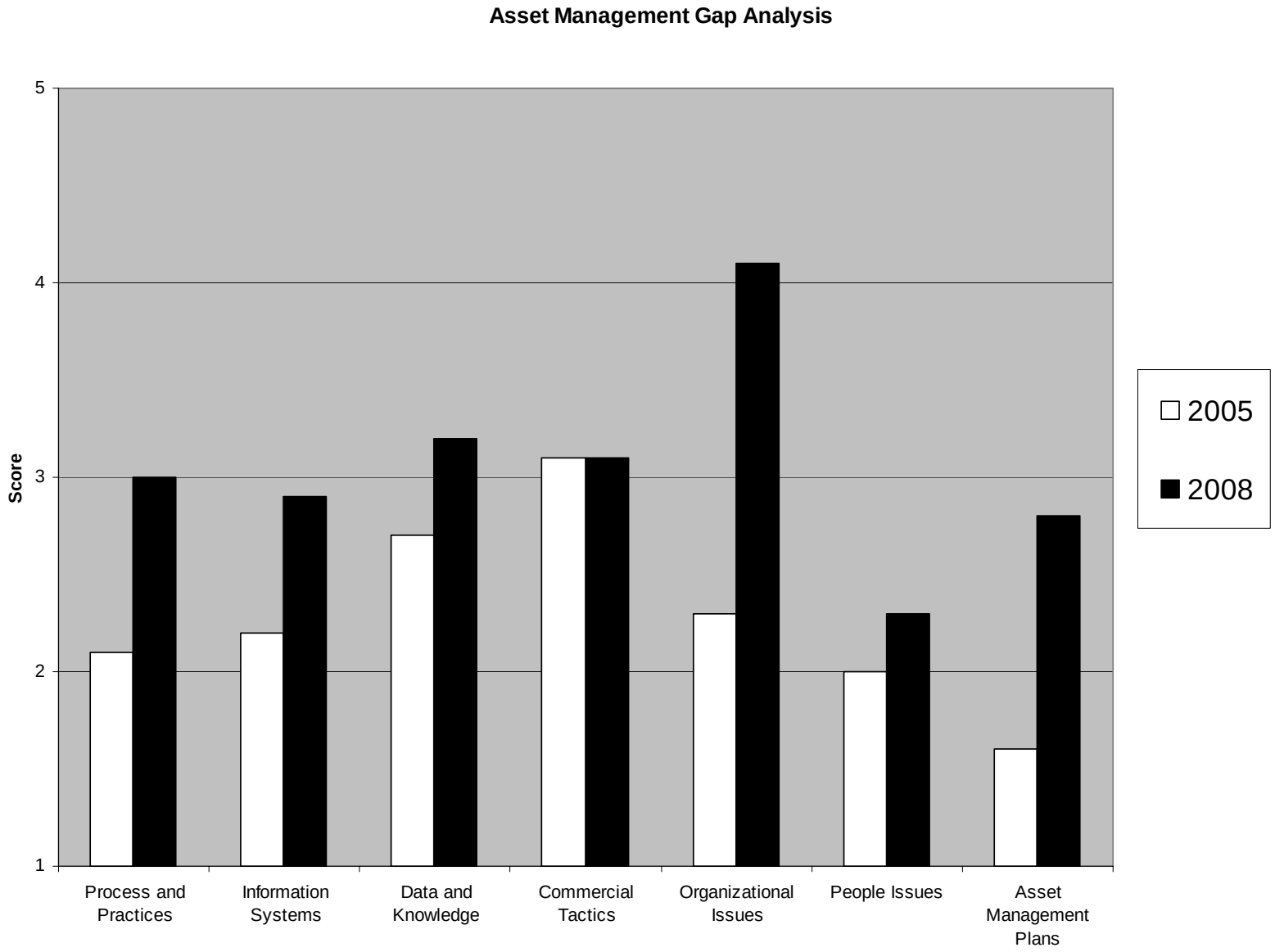

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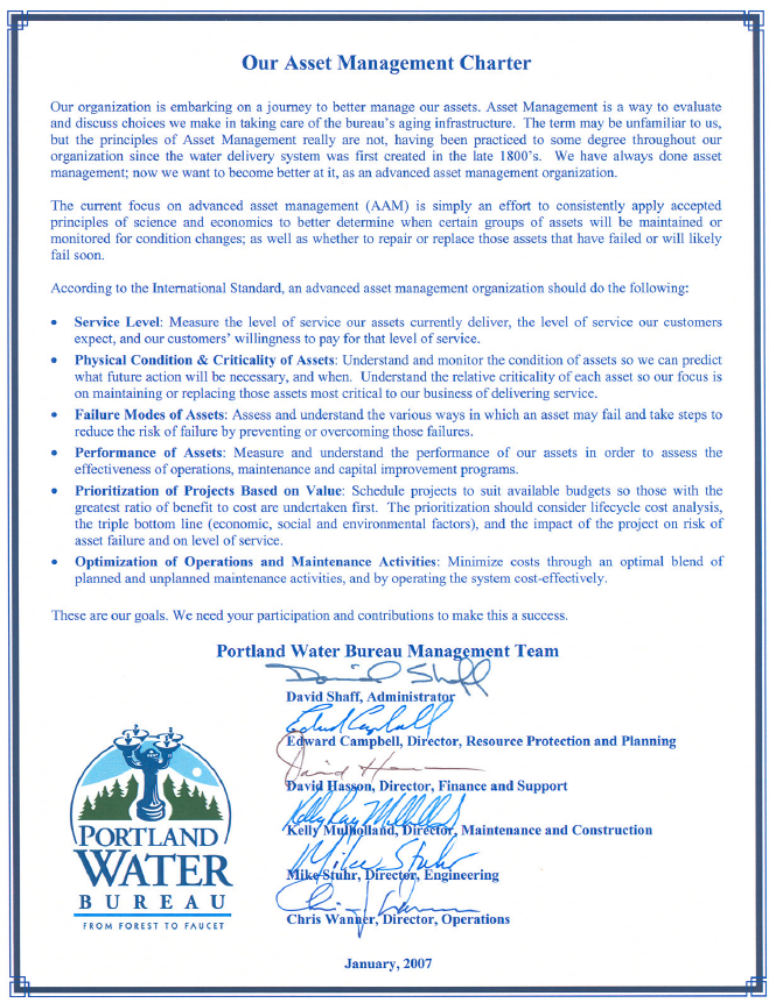
Business Process References

Organizational Issues (4)
Asset Management Plans (7)
Information Systems (2)
Data and Knowledge (3)
Demand Analysis (1.01)
Knowledge of Assets (1.02)
Accounting and Costing (1.03)
Strategic Planning (1.04)
Business Risk Management (1.06)
Maintenance (1.10)
Work and Resource Management (1.11)
Continuous Improvement (1.12)

Organizational Issues

- Steering Committee
- Coordinator
- Vision



Our Asset Management Charter

Our organization is embarking on a journey to better manage our assets. Asset Management is a way to evaluate and discuss choices we make in taking care of the bureau's aging infrastructure. The term may be unfamiliar to us, but the principles of Asset Management really are not, having been practiced to some degree throughout our organization since the water delivery system was first created in the late 1800's. We have always done asset management; now we want to become better at it, as an advanced asset management organization.

The current focus on advanced asset management (AAM) is simply an effort to consistently apply accepted principles of science and economics to better determine when certain groups of assets will be maintained or monitored for condition changes; as well as whether to repair or replace those assets that have failed or will likely fail soon.

According to the International Standard, an advanced asset management organization should do the following:

- **Service Level**: Measure the level of service our assets currently deliver, the level of service our customers expect, and our customers' willingness to pay for that level of service.
- **Physical Condition & Criticality of Assets**: Understand and monitor the condition of assets so we can predict what future action will be necessary, and when. Understand the relative criticality of each asset so our focus is on maintaining or replacing those assets most critical to our business of delivering service.
- **Failure Modes of Assets**: Assess and understand the various ways in which an asset may fail and take steps to reduce the risk of failure by preventing or overcoming those failures.
- **Performance of Assets**: Measure and understand the performance of our assets in order to assess the effectiveness of operations, maintenance and capital improvement programs.
- **Prioritization of Projects Based on Value**: Schedule projects to suit available budgets so those with the greatest ratio of benefit to cost are undertaken first. The prioritization should consider lifecycle cost analysis, the triple bottom line (economic, social and environmental factors), and the impact of the project on risk of asset failure and on level of service.
- **Optimization of Operations and Maintenance Activities**: Minimize costs through an optimal blend of planned and unplanned maintenance activities, and by operating the system cost-effectively.

These are our goals. We need your participation and contributions to make this a success.

Portland Water Bureau Management Team

David Shaff, Administrator

Edward Campbell, Director, Resource Protection and Planning

David Hasson, Director, Finance and Support

Kelly Mulholland, Director, Maintenance and Construction

Mike Stuhr, Director, Engineering

Chris Wanner, Director, Operations

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January, 2007

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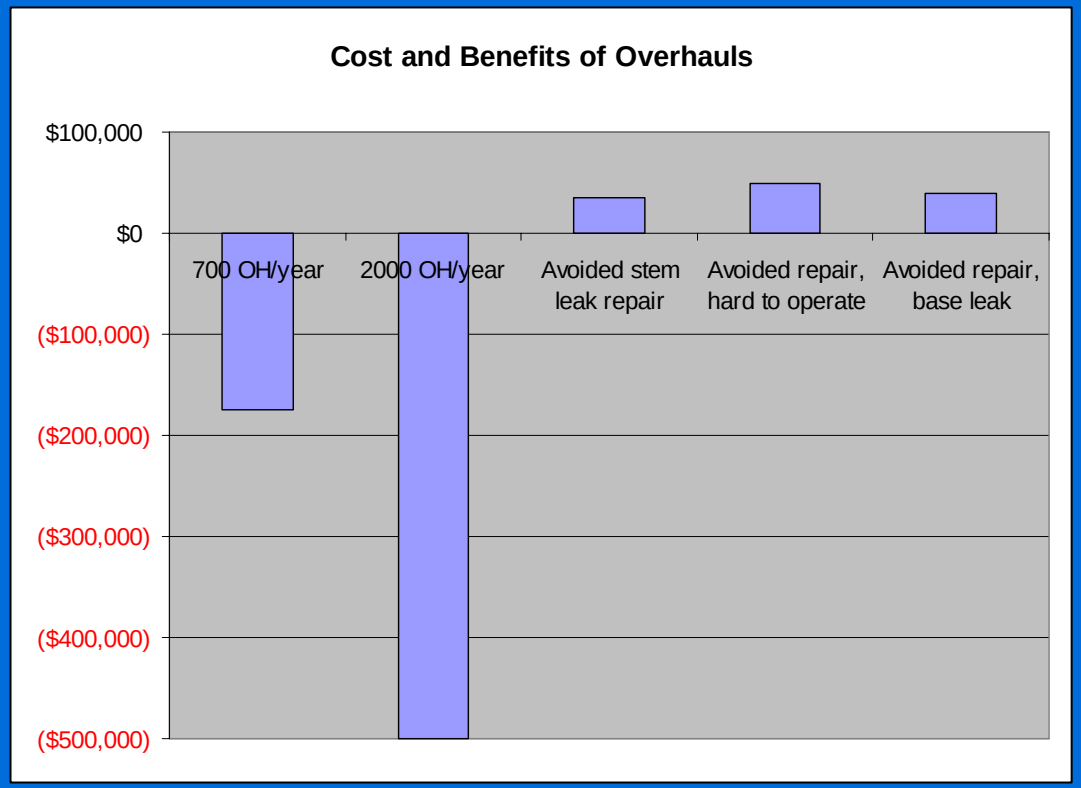
Asset Management Plans

Include:

- Service Levels
- Failure Modes
- Consequences of Failure
- Strategies to extend asset life



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Information Systems

- Primary – Asset Register
- Secondary – Condition Assessment Records System
- Tertiary - Risk Register

Asset	Failure Mode	Likelihood Rating	Consequence Rating
SOLIMAR (1/5 = M) (2/5 = H)	Unable to print bills, letters, reports for longer than 60 days	1-2 Longest downtime in past is 3 days. What might cause catastrophic failure? Flooding on floor? There is a untested "back-up" involving PGE	5 Unable to print bills for 60 days Revenue impact = $50M
Customer Information System (1/5 = M) (2/5 = H)	Unable to assist customers with questions, create bills, collect debt for 30 days	1-2 Two servers on 3rd floor, co-located. Server at BOEC is back-up, has not been tested	5 Unable to respond to Customers for 30 days. Revenue impact; public confidence impact
Sandy River Crossing (2/4 = M) (2/5 = H)	Pipe fails due to earthquake (Failure Mode #2)	2 Earthquake-induced; 1 in 100 year event	4-5 Tier 4 erosion; potential for Tier 5 fish impacts at low flow; Tier 4, mandatory curtailment, potentially?

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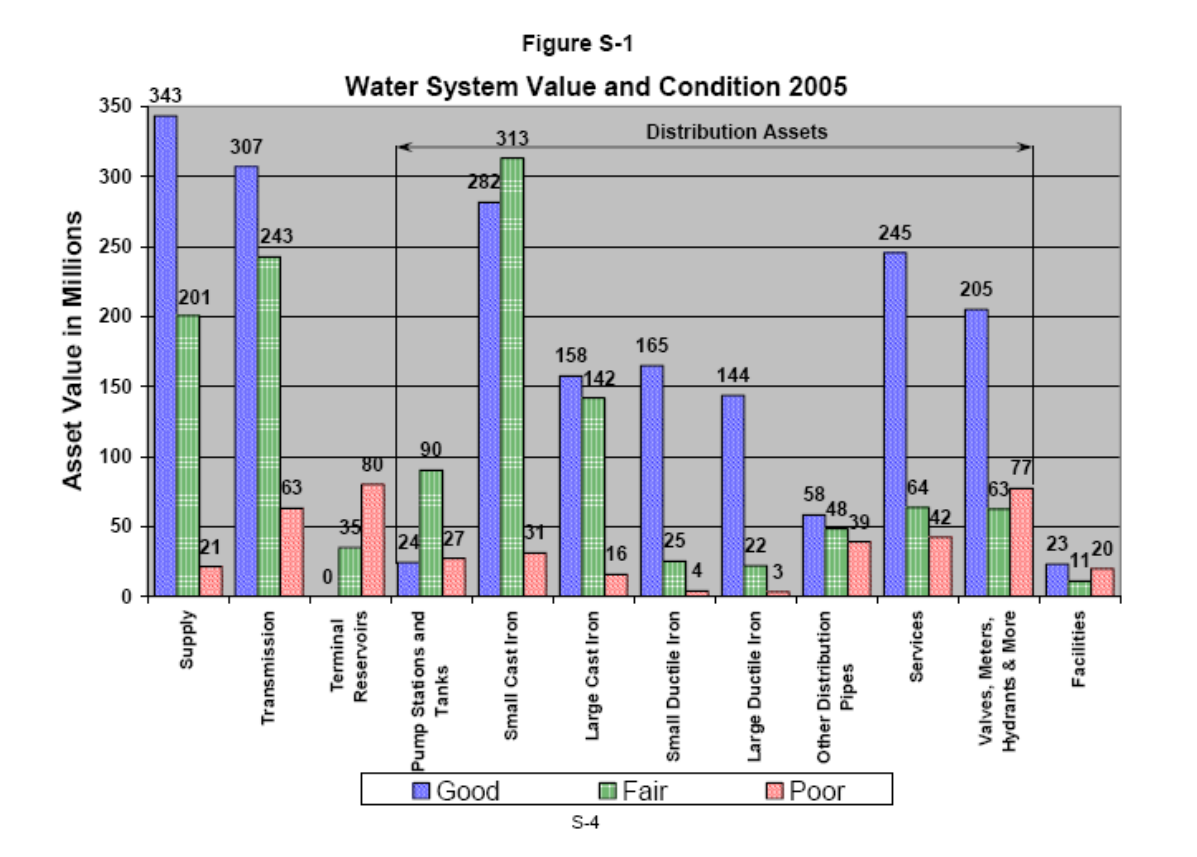
Data and Knowledge

- Primary – Asset Valuation
- Secondary – Maintenance History
- Tertiary – Cost History



Demands for Service

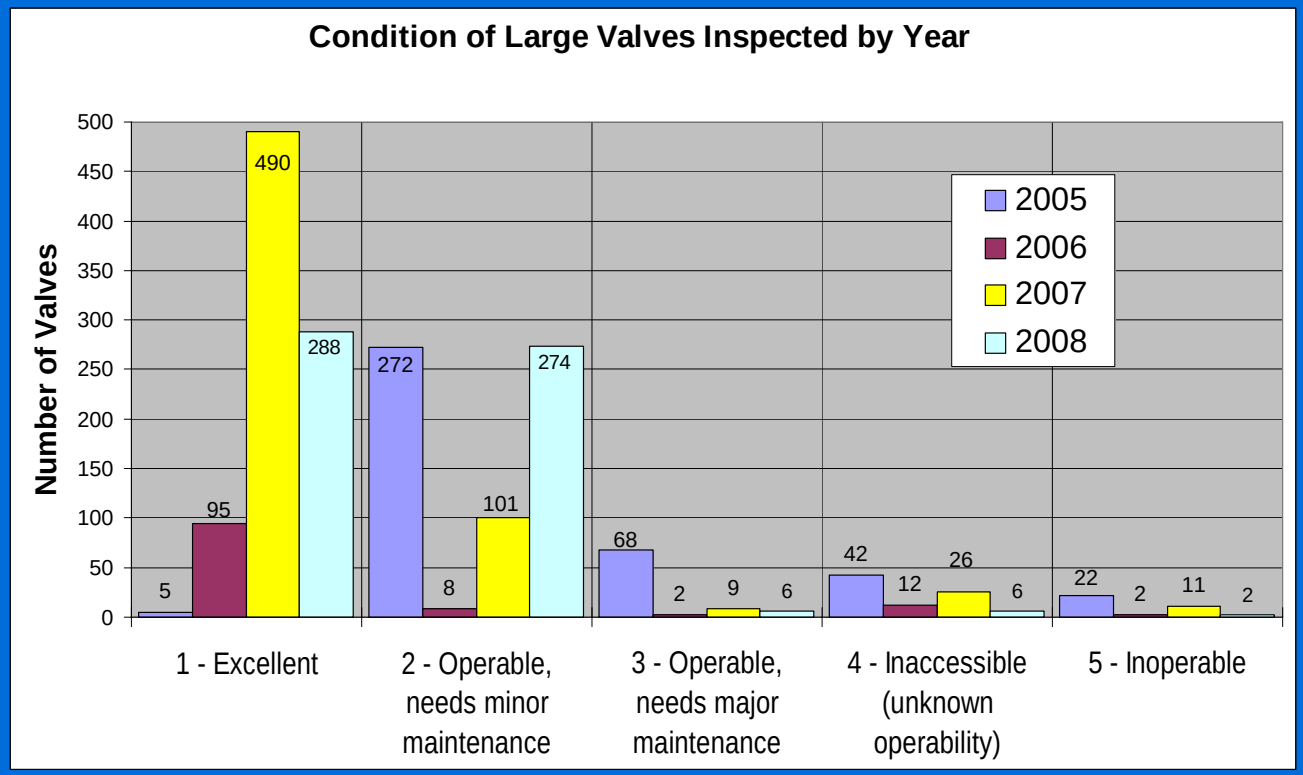
- Customer Surveys
- Defining levels of service

List of Service Level Indicators for the Portland Water Bureau

1. 100% compliance with state and federal water quality regulations.
2. Maintain minimum service pressure of 20 PSI 99% of the time.
3. Fewer than 7 complaints per 1000 customers per year.
4. 75% give High or Very High rating on Auditor's SEA survey.
5. Respond to 95% of customer inquiries within 5 business days.
6. Answer 80% of calls within 60 seconds.
7. No more than 5% of customers out of water for more than 8 hours a year.
8. No customer out of water more than three times per year.
9. Complete 90% of service installs within 15 days.
10. At least one working hydrant within 500 feet of service connection.
11. 90% of flow control valves operate when needed. 99% of flow control valves are in the proper operating position.
12. Maintain Aa1 bond rating for revenue bonds.
13. Meet or exceed planned debt service coverage.
14. Complete projects on schedule.
15. Achieve continuous improvement in maintaining assets.
16. Meet standards for mitigating medium, high, or extreme risk of asset failure.
17. New CIP projects require rigorous cost analysis (see related article).
18. 50% of employees report they are fully engaged in and enthusiastic about their work.
19. Maintain OSHA SHARP certification.
20. 60% of promotional vacancies are filled with internal candidates.
21. Workforce diversity mirrors Portland community.
22. Residential water use remains steady or declines.
23. Technical assistance results in an average 25% water savings by industrial and commercial customers.
24. Bureau's carbon emissions are reduced from 2007 levels.
25. Percent of energy use from renewable sources increases from 2007 levels.

Processes for determining data collection

- Which assets require condition data
- Which assets require performance data



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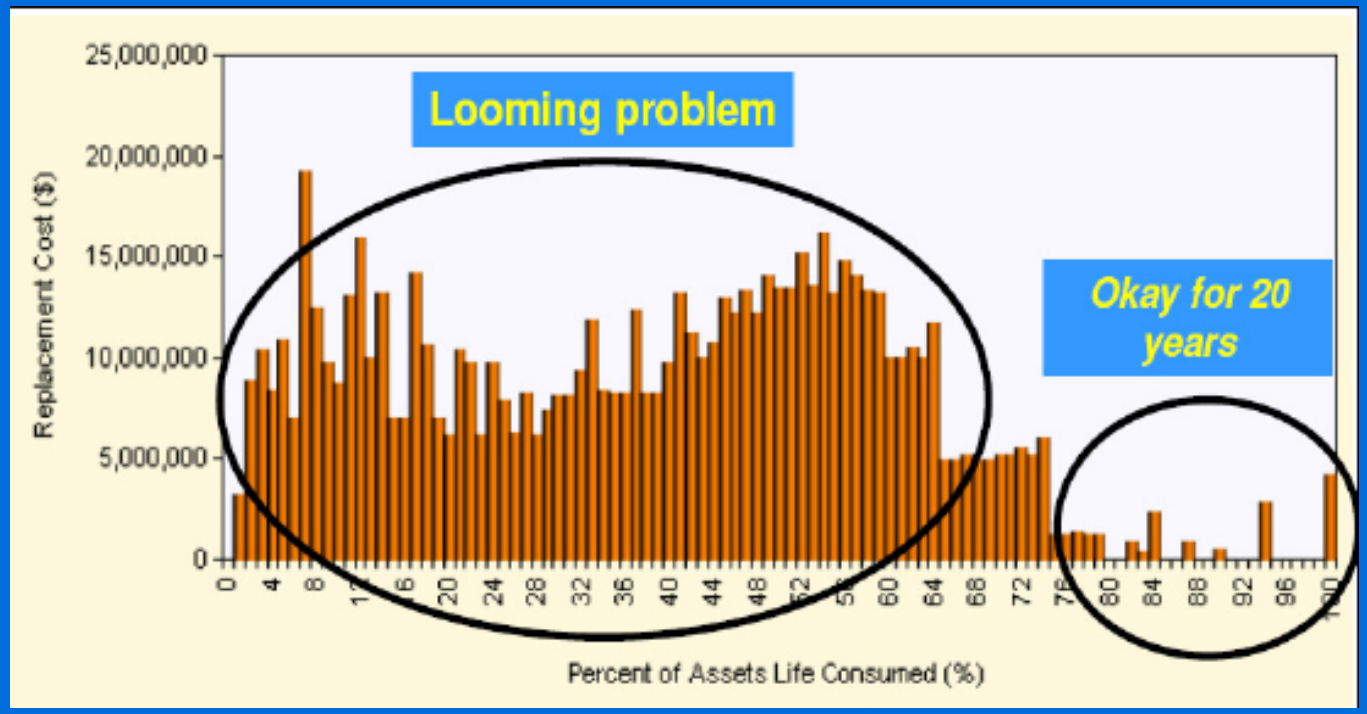
Processes to Predict Future Costs

- Asset Effective Lives
- Future Renewal Liabilities



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Strategic Planning Processes

- Optimized Decisions
- Life Cycle Costing
- Triple Bottom Line Evaluations

Business Risk Management

- Process for quantifying likelihood and consequence of failure
- Risk Mitigation

Likelihood	Consequences				
	1 Very low	2 Low	3 Moderate	4 High	5 Very high
Very low (1)	VL	VL	L	M	M
Low (2)	VL	VL	M	M	H
Moderate (3)	L	L	H	H	E
High (4)	L	M	H	E	E
Very high (5)	L	M	H	E	E

- Meet at least 80% of standards established for inspection, testing, repair and replacement of assets that are identified as medium, high or extreme risk

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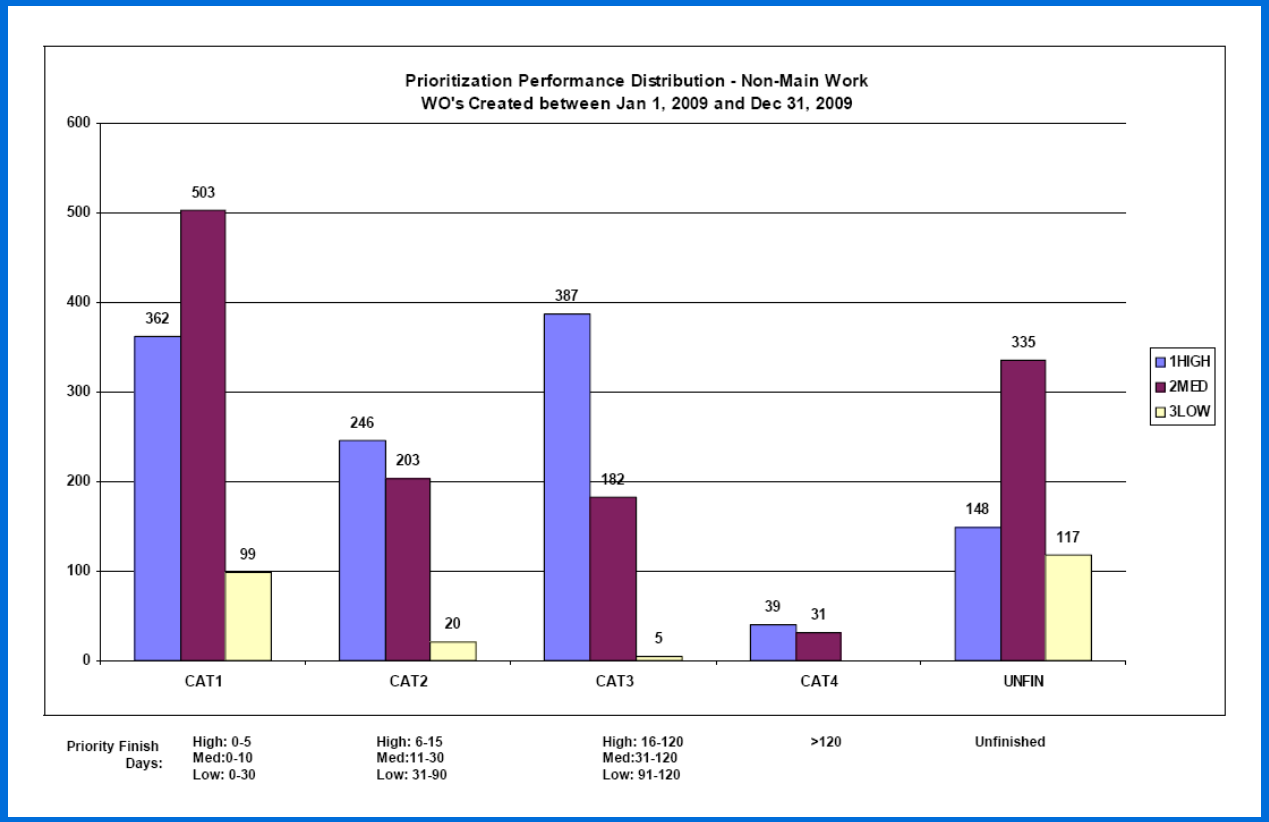
Maintenance

- Maintenance Planning and Scheduling



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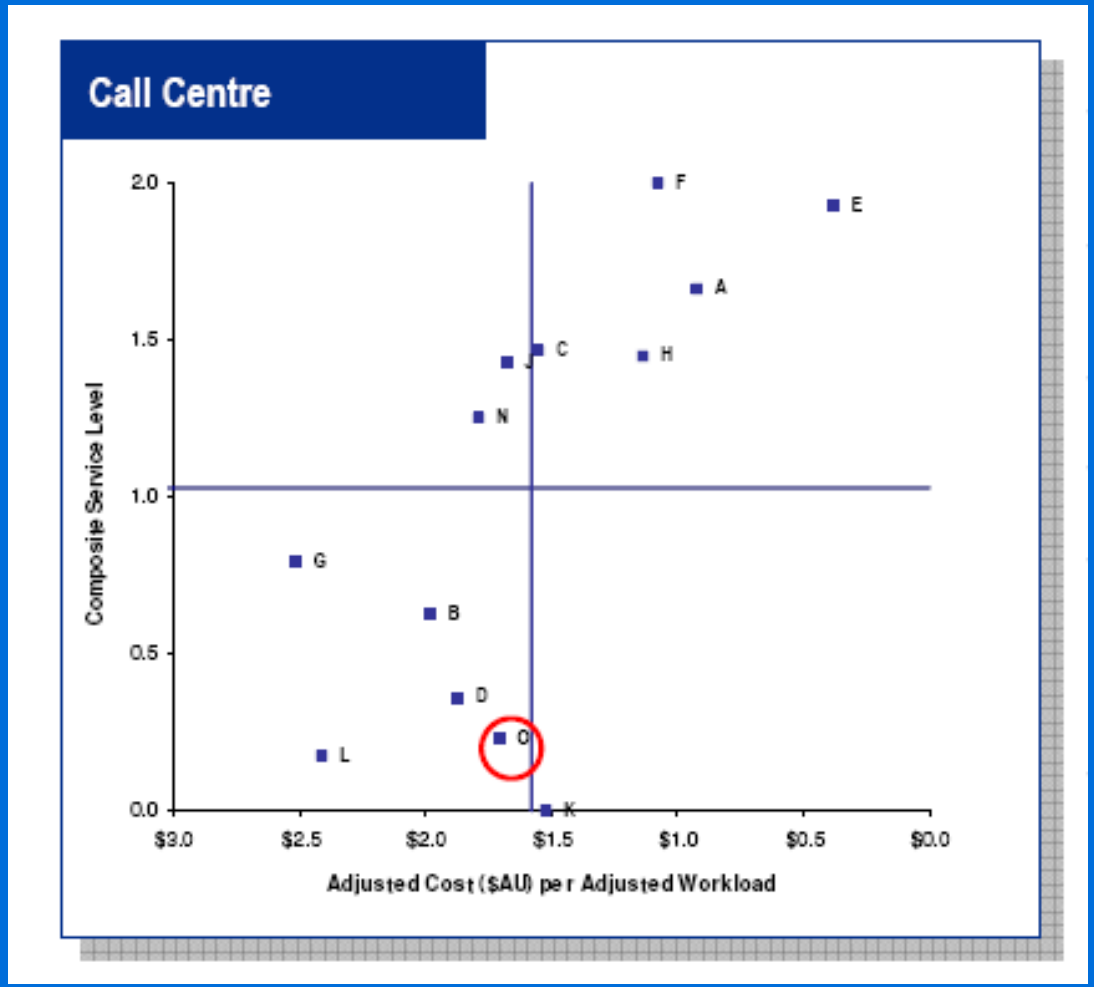
Work and Resource Management

- Processes for prioritizing work orders

Code	Priority	Service Level Description
9	A1	Mandatory - regulatory requirements
9	A2	Health and Safety concern - high
8	A3	System reliability improvement - critical asset likely to fail
8	A4	Maintain minimum system pressures
7	A5	Health and Safety concern - moderate
7	A6	Current Condition threatens water quality
6	B1	System reliability improvement - less critical asset
6	B2	Economic improvement with strong business case (high return on investment)
5	B3	Maintenance could significantly prolong the life of a relatively critical asset
5	B4	Future threat to water quality
3	C1	Health and Safety concern - low
3	C2	System reliability improvement - moderately criticality or redundant asset
3	C3	Maintenance could improve condition of relatively critical asset
3	C4	Economic improvement with weak business case (low return on investment)
2	C5	Aesthetics or cosmetic improvement

Continuous Improvement

- Auditing and benchmarking Asset Management Practices



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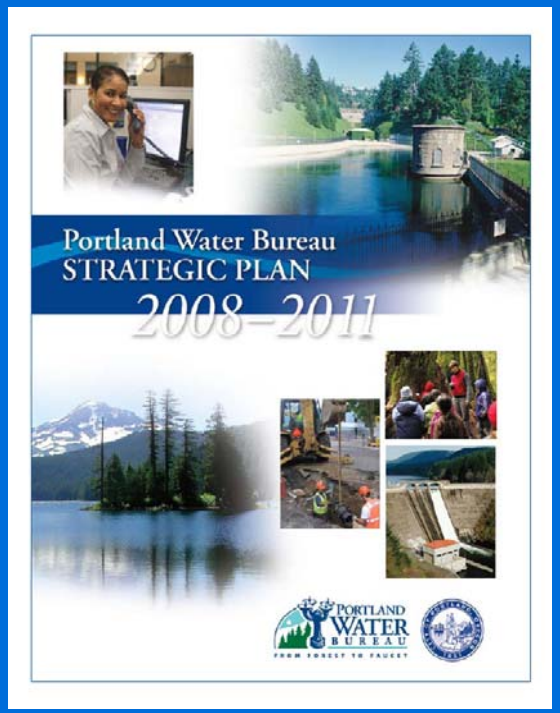
Performance Benchmarking – Service Level Targets



- Maintain minimum pressure of 20 pounds per square inch (psi) during normal demands

- Answer 80% of calls within 60 seconds
- Fewer than 7 complaints per 1000 customers per year
- No more than 5% of customers out of water for more than 8 hours a year

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Portland's Asset Management Program: Benchmarking and Progress

Questions?

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