Sustainable Infrastructure & Water Measurement for Bend

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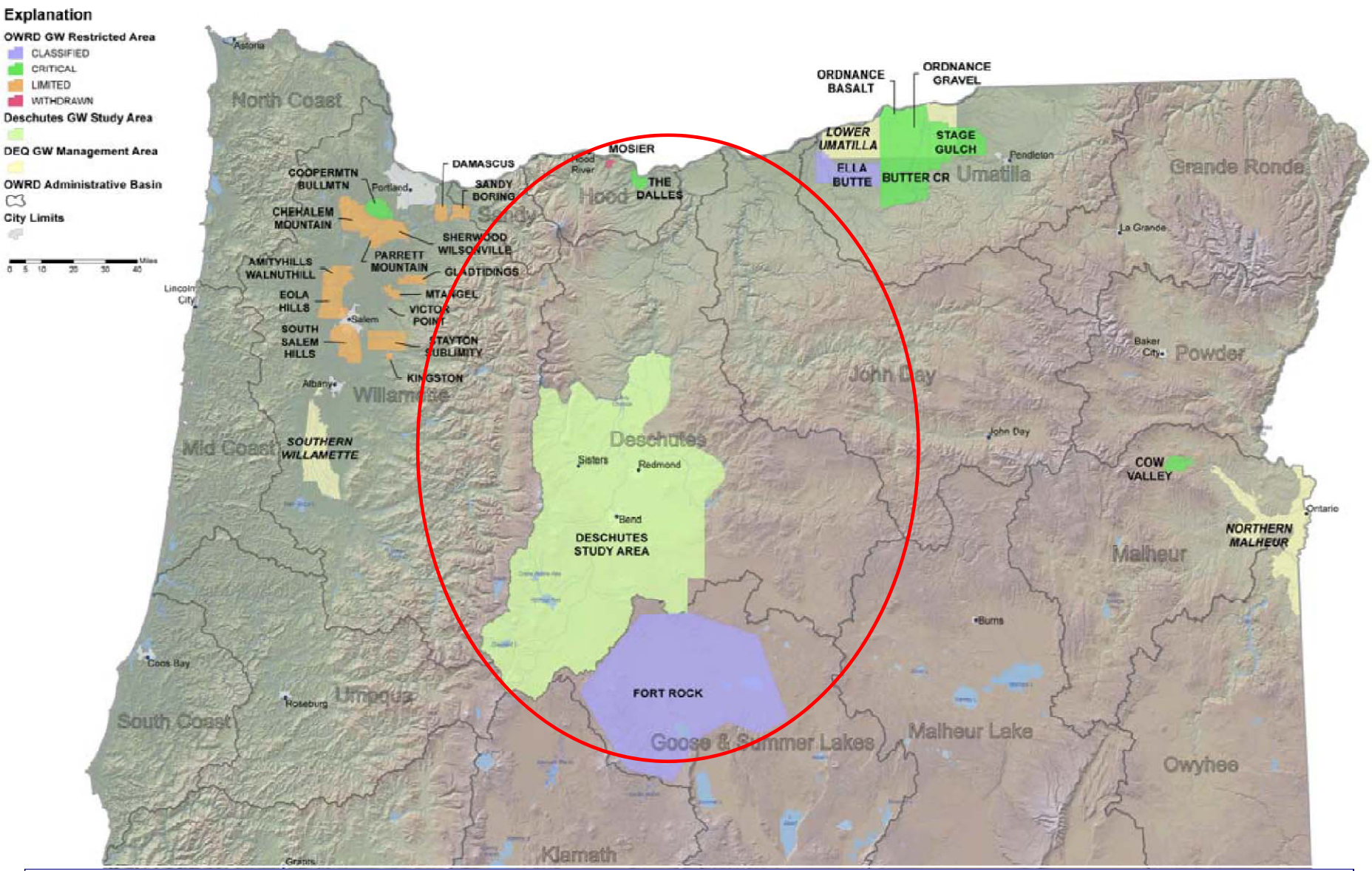
EPA - Four Pillars of Sustainable Infrastructure

- **Better Management: using asset management and environmental management systems.**
- **Full Cost Pricing for services using rate restructuring**
- **Efficient Water Use encourage more efficient use of water and to protect our sources of water.**
- **Watershed Approaches looks more broadly at water resources in a coordinated way**

Bend: Deschutes Basin



No "new" water available for allocation

Patrick observing his latest water rights conquest

Bend Fast Facts

Population

- 82,000 and still growing – not quite as fast…
- Serve water to about 75% of Bend

Service Connections

- 23,000 Connections
  - 1/4 Commercial
  - 3/4 Residential

Current Water Use

- 12 mgd annual average daily use
- 6 mgd winter season / 18 mgd summer season
- 30 mgd *peak* summer day (one day summer 2008)

Water Sources

- 50% Surface Water from Bridge Creek
- 50% Groundwater from regional aquifer

Measurement Continuum

Measurement Nirvana…

- **Un-metered, or poorly measured**
- **Little data,**
- **Little or no analysis**
- **Un-coordinated**
- **"No need…"**

- **Fully measured**
- **Fully Audited**
- **Full GIS layers**
- **Heavy analysis**
- **All Location information**
- **Fully Coordinated: internally and externally**

Bend's Measurement History

- 75% users ***<u>Unmetered</u>*** until 2004!
- Finance: Collected "dollars" un-connected to quantity used… flat rate
- Original Customer class designations: designed for billing, not cost of service… or other planning needs
- Billing and Production never "audited", why?

Measurement Drivers

- Plan capital investment
- Water supply planning / water rights
  - Conservation investment (WMCP)
- Operational metric (Asset mgt)
- Fire flow, hydraulic modeling
- Identify non-revenue water…
- Provide basis for rate setting
- Baseline for progress & new policies

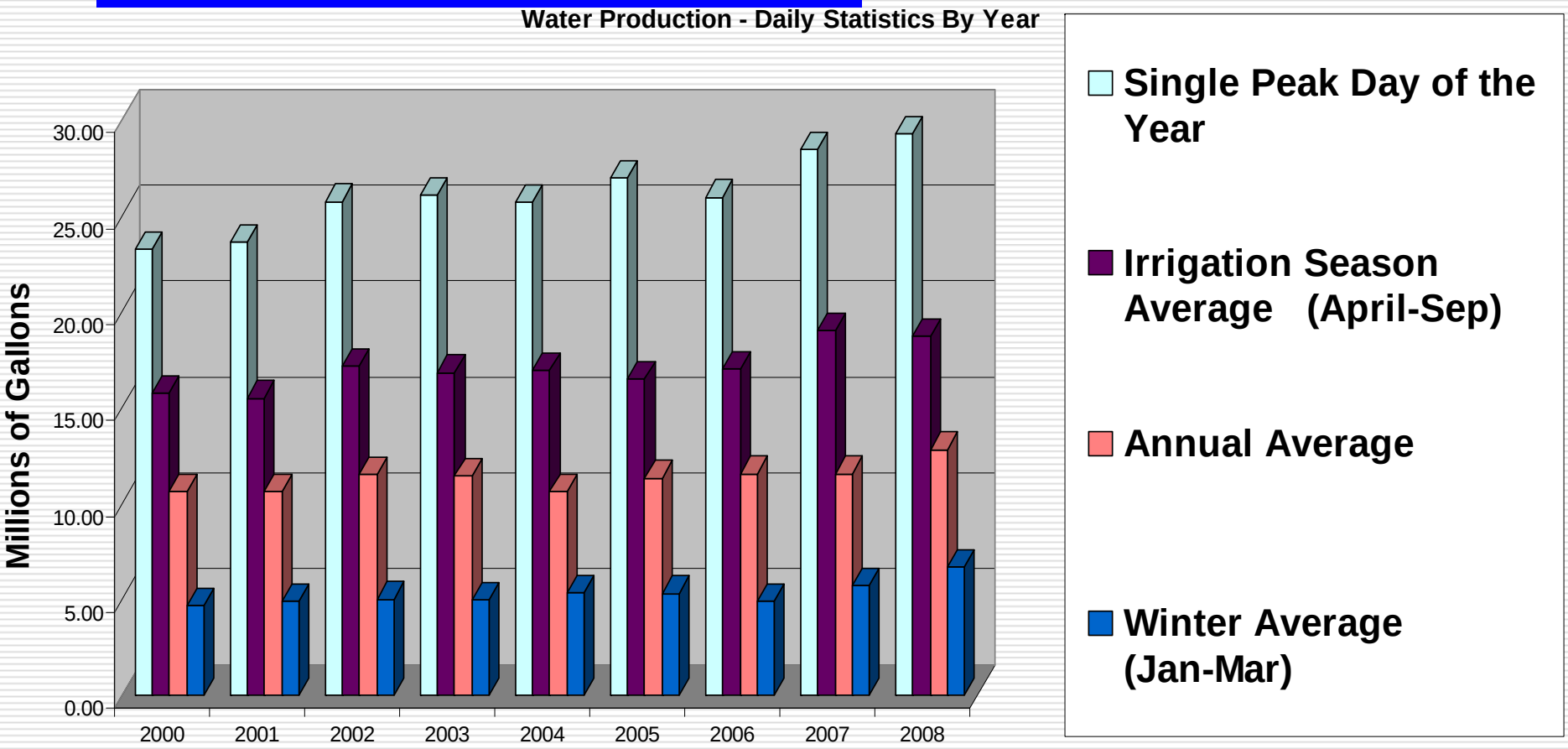
Measurement Drivers

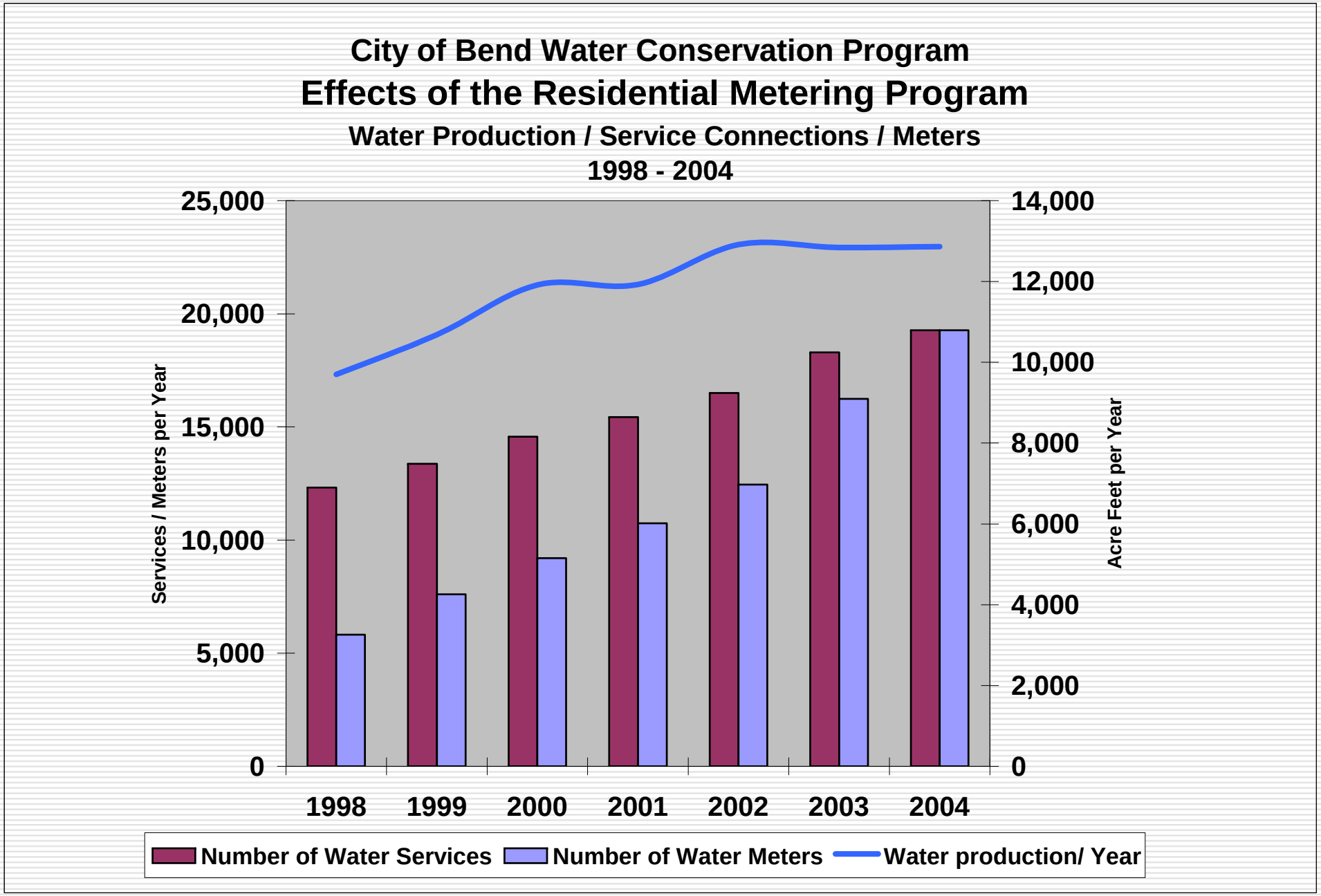
- **Justify investment priorities**
- **Meet regulatory requirements**

Water Supply Portfolio

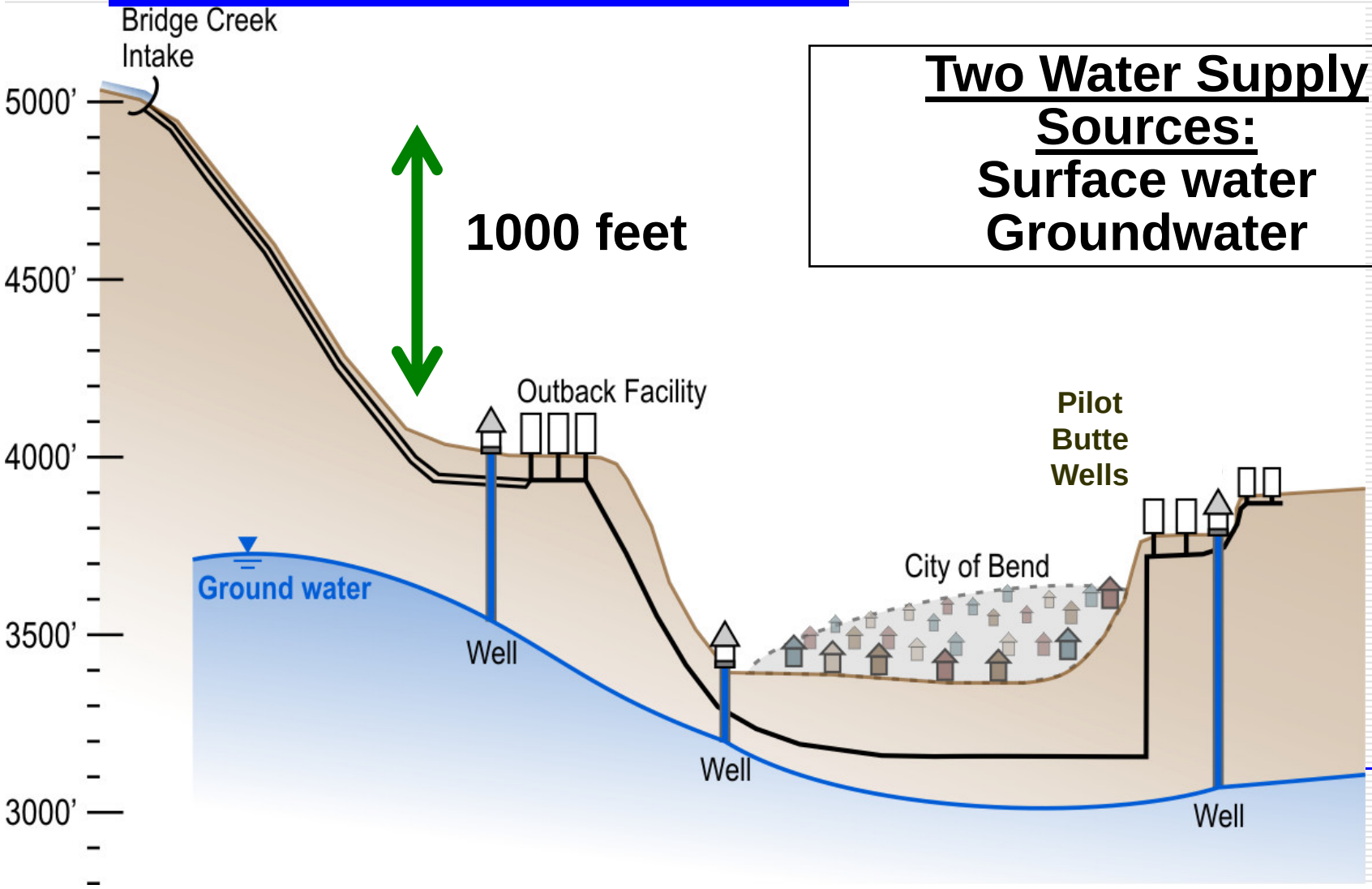
- Surface Water 50%
- Groundwater 50%
- Conservation ?
- Reuse ?

Identifying Trends



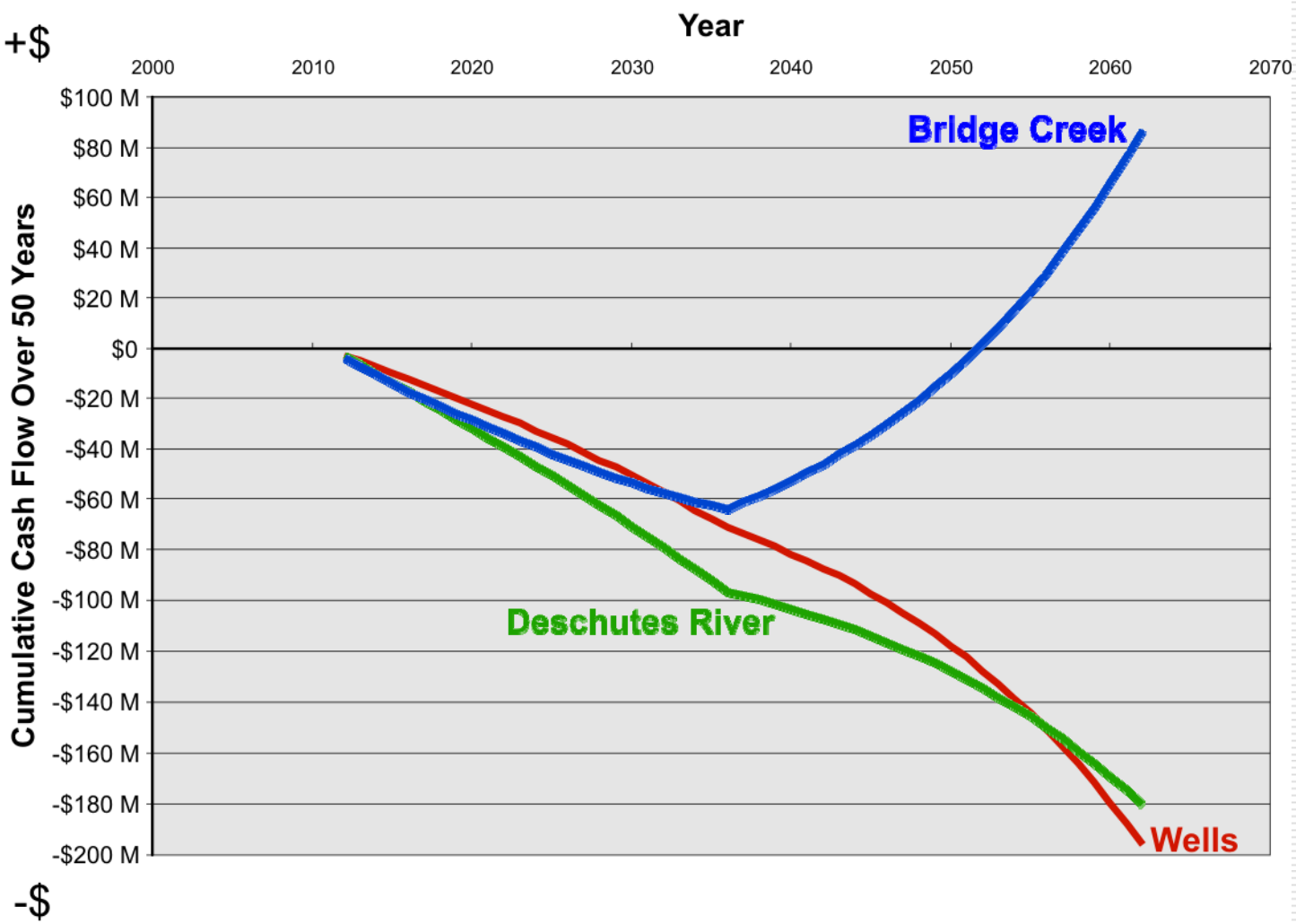

City of Bend Water Conservation Program
Effects of the Residential Metering Program
Water Production / Service Connections / Meters
1998 - 2004
Services / Meters per Year
Acre Feet per Year
25,000
20,000
15,000
10,000
5,000
0
14,000
12,000
10,000
8,000
6,000
4,000
2,000
0
1998
1999
2000
2001
2002
2003
2004
Number of Water Services
Number of Water Meters
Water production/ Year

Making Informed Water Supply Choices



Two Water Supply Sources:
Surface water
Groundwater

Long Term Energy Considerations



How to Scare Your Finance Director

Sophisticated

Financial

Model

"Simulator"

Total Water Use within your System?

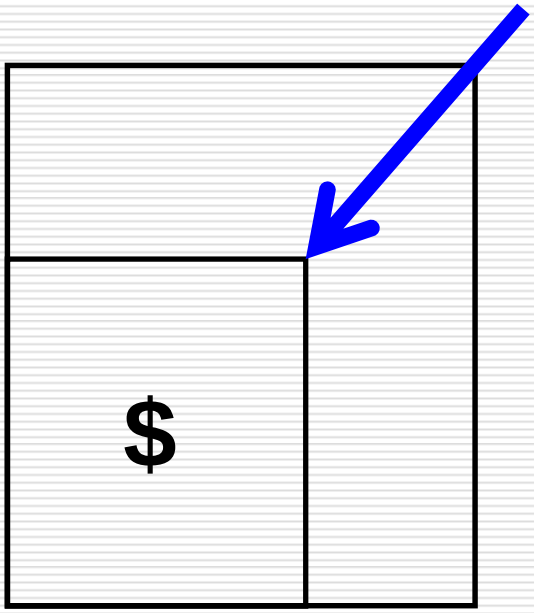
How much water does one EDU get?

What Rate?

What Volume?

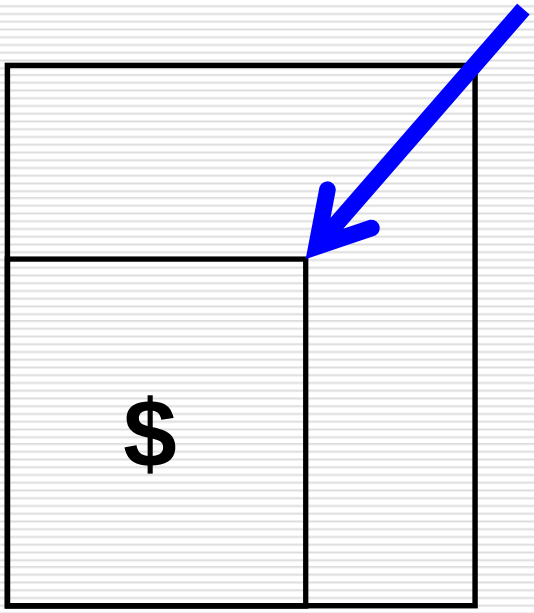
How to Scare Your Finance Director

Current revenue "base" built on excessive use…



How to Scare Your Finance Director

- Quantity vs Fixed Rate
- SDC's
- Policies



- Rate Stability Fund ?

Bend's Measurement "Plan" Key parts

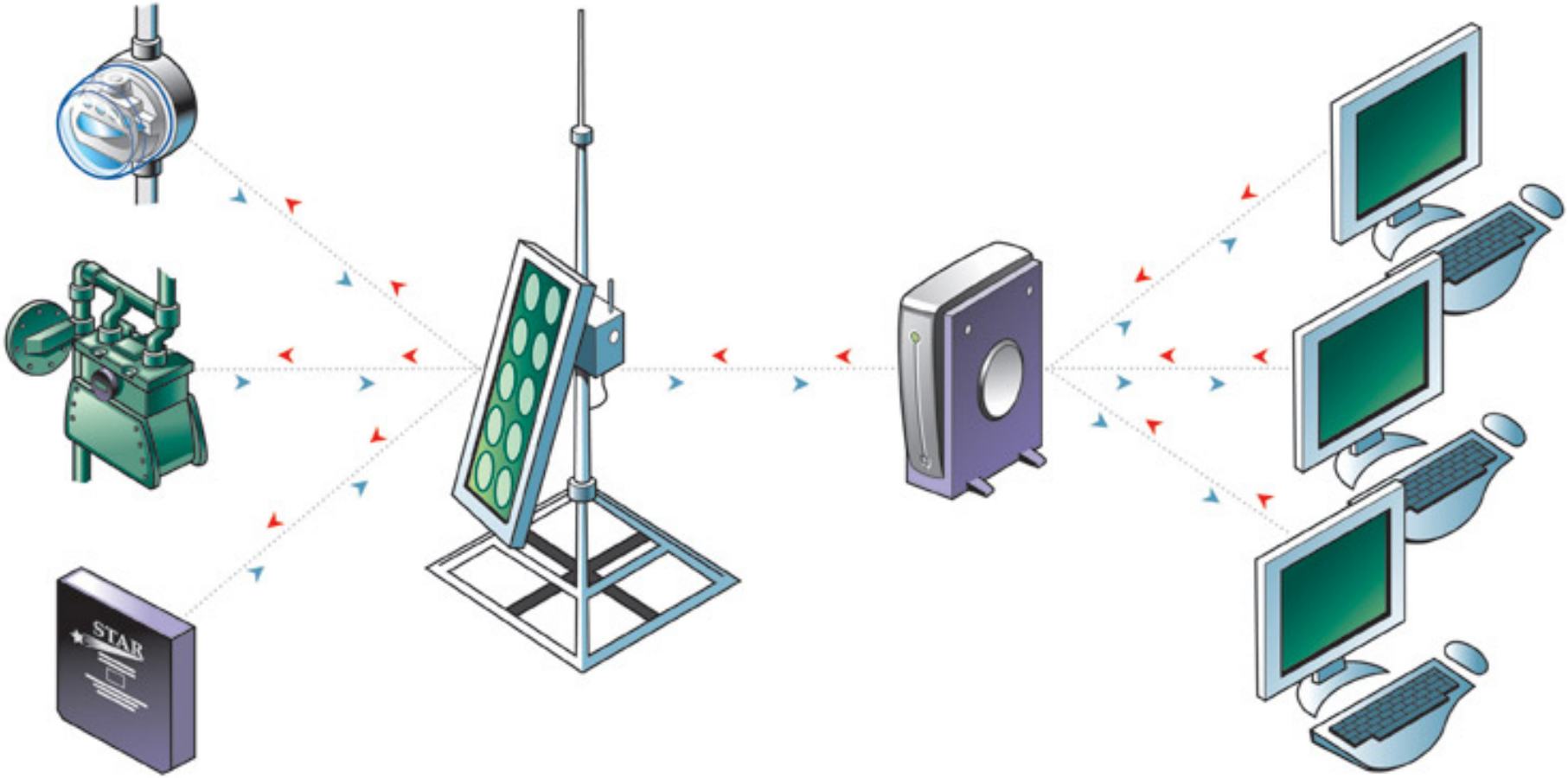
- **Database 101 "ownership"**
  - CMMS : Asset Management
  - Billing System
- **"Meters"**
  - Key "profit, planning and data-information center"
- **GIS**: Basis for integration / analysis
- **SCADA**: operational connection (2 way)

Data Base 101

- Multiple owner problem (opportunity)
- “Own it”
- Update processes – preserve quality
- Integrate it, use bright lights, question everything…
- Analyze early and often
- Ground truth with operations staff and others

Meters: AMI

(automated meter *infrastructure*)



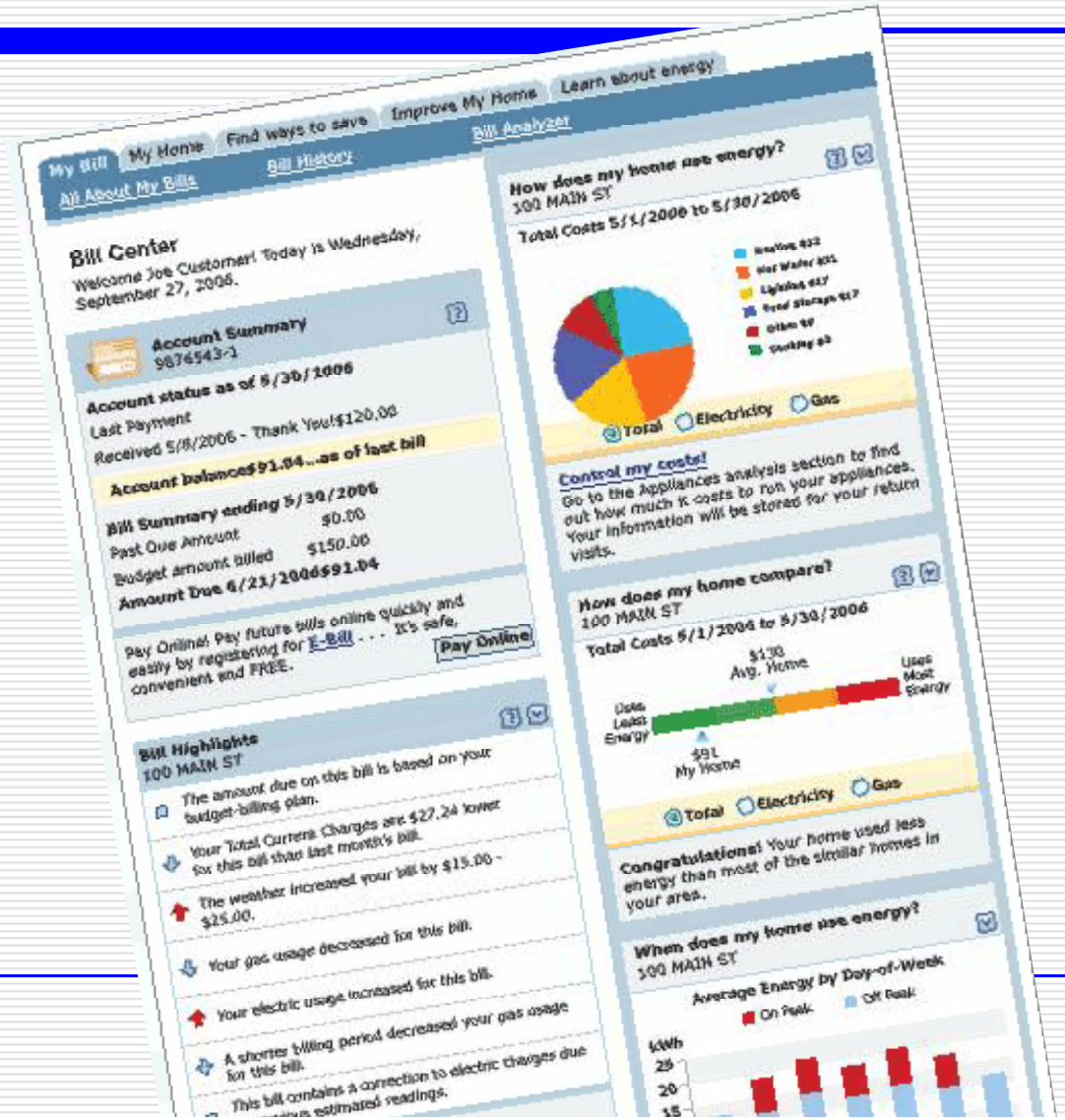
Meter Transmission Units (MTU)

Data Collector Unit (DCU)

Network Control Computer

Utility Company

Customer Info



- Informed customers
- Less truck trips
- Leaking & Peaking
- Data logging
- Modeling

Empowering customers with AMI data can help drive efficiency…
Customer Q: “What should I be using?”

Non Revenue Water

- **REGULAR REPORTING - system**
  - *Engineering* water
  - Fire Dept
  - Sweepers
  - WQ Water (Flushing Program)
  - Reservoir cleaning
  - Leaks – estimates
  - Large projects (Bend Parkway)
  - Misc others

Hydrant Meter

CMMS

Computerized Maintenance Management Systems

- **Assets? What assets…**
- **Phased approach- group by group**
- **Water meters – last ones into system**
- **GIS Based**
- **Additional sources of connected information**
- **Needs consistent process & updates**

Billing System

- Key data feeds (AMI and others)
- New Customer classes
- Billing records / Reporting processes
- Customer Access
- Pilot projects: Water Budget Based Rates, to “Time of Day Watering”

GIS

- **Standardized basis for all information**
- **Key repository –**
  - Individual “owners”
  - Multiple depts demand coordination
- **Analysis & Reporting**
- **Methodology – documented…**

SCADA

Supervisory Control and Data Acquisition

- **Key data collection**
- **Data logging and "silent provider"**
  - GIS / CMMS / Billing
  - Key operational metrics
- **Driven off of key measurement centers**
- **Automated reporting – data repository**
- **Start with regulatory drivers**

Moving Ahead

- Establish baselines
- Systems thinking - integration
- Keep the finest resolution of data
- Collaborate early & often
- Analyze, think, Analzye some more…
- Track and question all methodology
- Seek Measurement Nirvana…

Questions?

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