Montara Water and Sanitary District
2011 Water System Master Plan

Public Workshop
March 17, 2011

SRT consultants

PRESENTATION OVERVIEW

- Water System Retrospective
- Master Plan Purpose and Approach
- General System Overview
- Supply and Demand Overview
  - Production Data Summary
  - Consumption Data Summary
  - Demand Analysis
  - Reliable Supply v. Demand Analysis
- Capital Improvements Program

WATER SYSTEM RETROSPECTIVE

MWSD Acquisition and System Improvements

- MWSD acquires system in May 2003
- MWSD Board and Management begin system-wide improvement projects

WATER SYSTEM RETROSPECTIVE

Pipeline Improvements

- Raw Water Pipeline Replacement
- Distribution System Flow Improvements
- Water Main Replacement Project

WATER SYSTEM RETROSPECTIVE

Alta Vista Improvements

- Alta Vista Tank Seismic and Safety Improvements
- Alta Vista Water Treatment Plant Seismic and Efficiency Improvements
- Alta Vista Water Treatment Plant Raw Water Tank Solids Settling Improvements

WATER SYSTEM RETROSPECTIVE

Replacement Projects

- Portola Tank Road Replacement and Drainage Improvements

- Pressure Regulating Stations Replacement Project

WATER SYSTEM RETROSPECTIVE

Well and Pumping Improvements

- Well Pumping and Power Efficiency Improvements
- Variable Frequency Drive Installation at Wells
- Wagner & Drake Well Pumping & Treatment Modifications
- South Airport & Airport #3 Well Rehabs
- Portola #1, Portola #3, & Portola #4 Well Rehabs, Pump and Motor Replaced
- North Airport Well Treatment Installation

WATER SYSTEM RETROSPECTIVE

Controls Improvements

- Supervisory Control & Data Acquisition System (SCADA) Improvements
- Solar Power Installation
- All Water Meters Replaced with Automated Meter Reading System

WATER SYSTEM RETROSPECTIVE

Conservation Program

- Rebate Program
- Leak Detection Program
- Water Audit
- Leak Repair Program
- Public Education

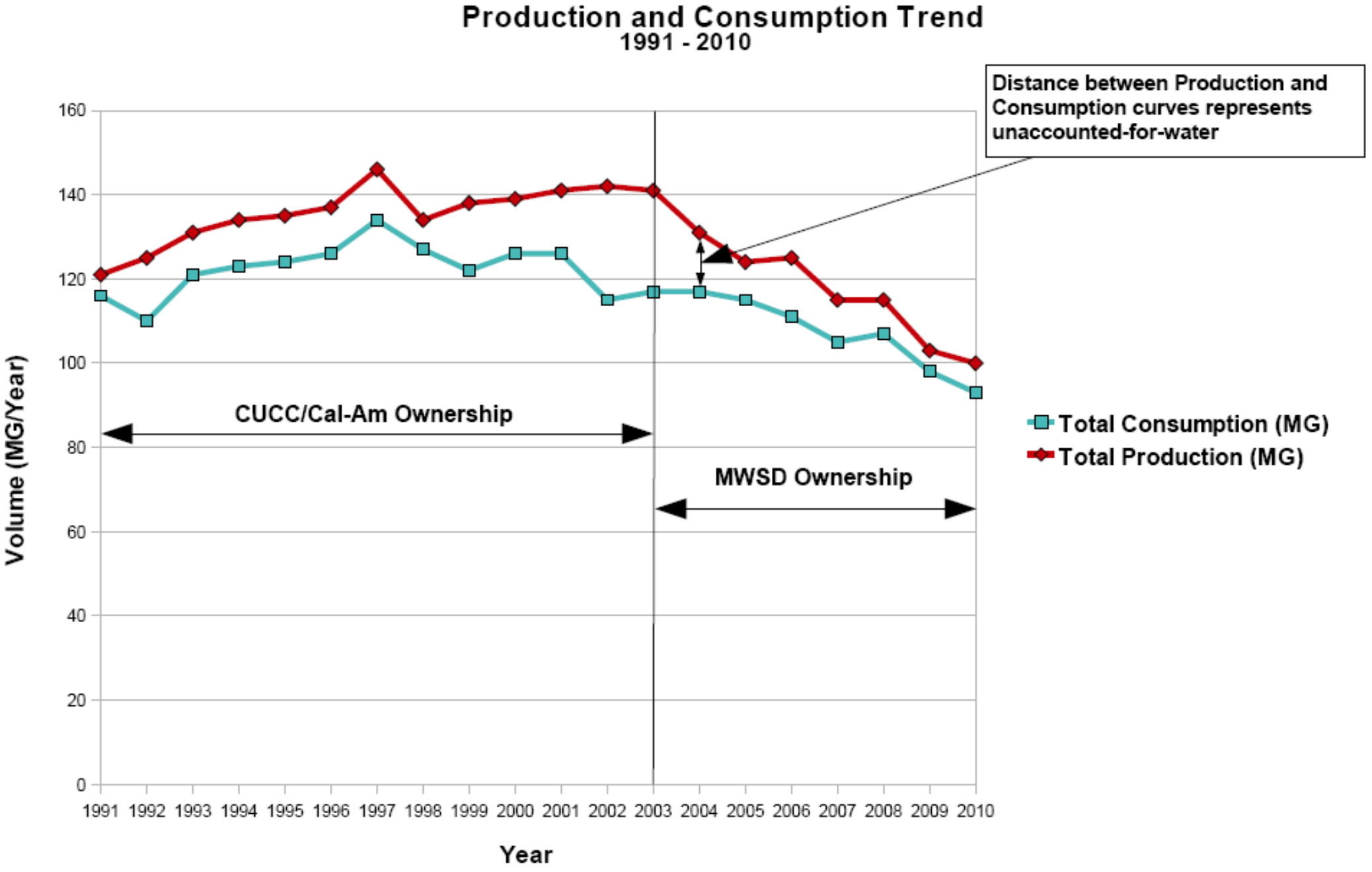
Drip Calculator

Measure and Estimate Water Wasted Due to Leaks.

SILICON VALLEY
Water Conservation
AWARDS

WATER SYSTEM RETROSPECTIVE

Significant Changes in Water Demand



WATER SYSTEM RETROSPECTIVE

Summary

- MWSD has made significant improvements in the system that resulted in production and consumption shifts
- A critical time for the following:
  - Detailed data evaluation since MWSD acquisition
  - Revisiting old planning documents and understanding previous system conditions
  - Development of an updated and representative ***Water System Master Plan***

MASTER PLAN PURPOSE AND APPROACH

Master Plan Objectives:

- To present a clear picture of the current supply, demand, and distribution system conditions of the water system
- To project the future demands on the system and assess the capacity of the sources and distribution system to meet that demand
- To act as the guiding document for future policy and management decisions

MASTER PLAN PURPOSE AND APPROACH

Master Plan Outcomes:

- A living planning document that focuses on water system supply, demand, and distribution system analysis, usually updated every 5-10 years
- ***Capital Improvements Program***: a short-term plan that identifies capital projects and equipment purchases, and provides a general schedule and budget for the improvements

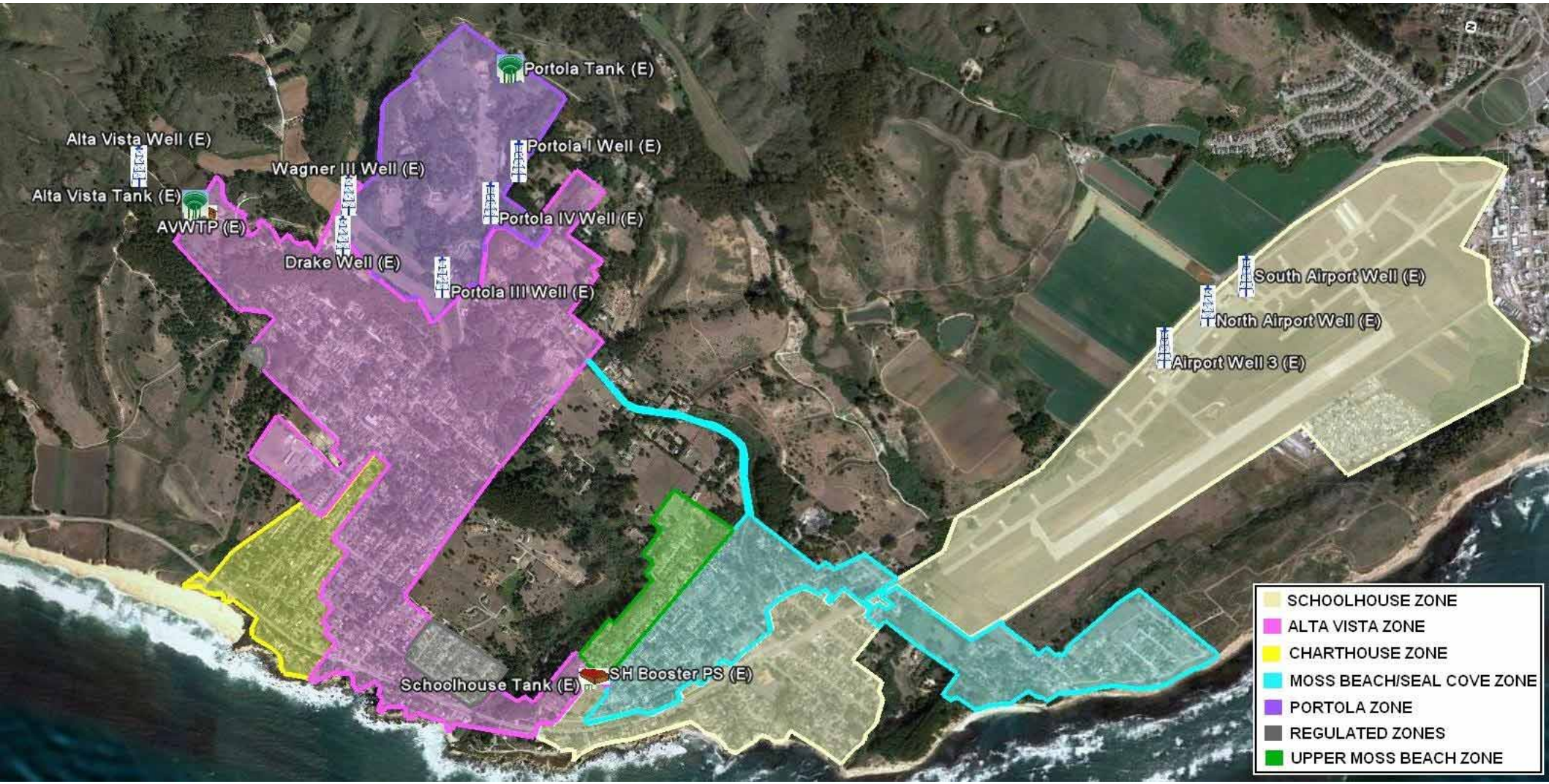
MASTER PLAN PURPOSE AND APPROACH

MWSD Specific

Master Plan Approach		
MWSD Now	**MWSD's Needs**	**How MWSD Can Address the Needs**
Serving Customers with Water Meeting All Drinking Water and Safety Standards **<u>Facilities</u>** Water Storage Tanks Wells and Pumps Surface Water Treatment Plant Wellhead Treatment Distribution System **<u>Sources</u>** Montara Creek Nine Groundwater Wells	**Ability to Reliably Serve Current and Future Water Demands** **Continue to Serve Water Meeting All Drinking Water and Safety Standards** **Function Reliably and Cost-Effectively to Keep Water Rates as Low as Possible**	**<u>Short-Term: Now to 2015</u>** Implement facility improvements Explore options for additional water supply **<u>Long-Term: 2015 - Buildout</u>** Develop additional water supply to meet buildout demands Implement facility improvements

CURRENT WATER SYSTEM OVERVIEW

- 1614 Residential, 30 Commercial, and 133 PFP Connections

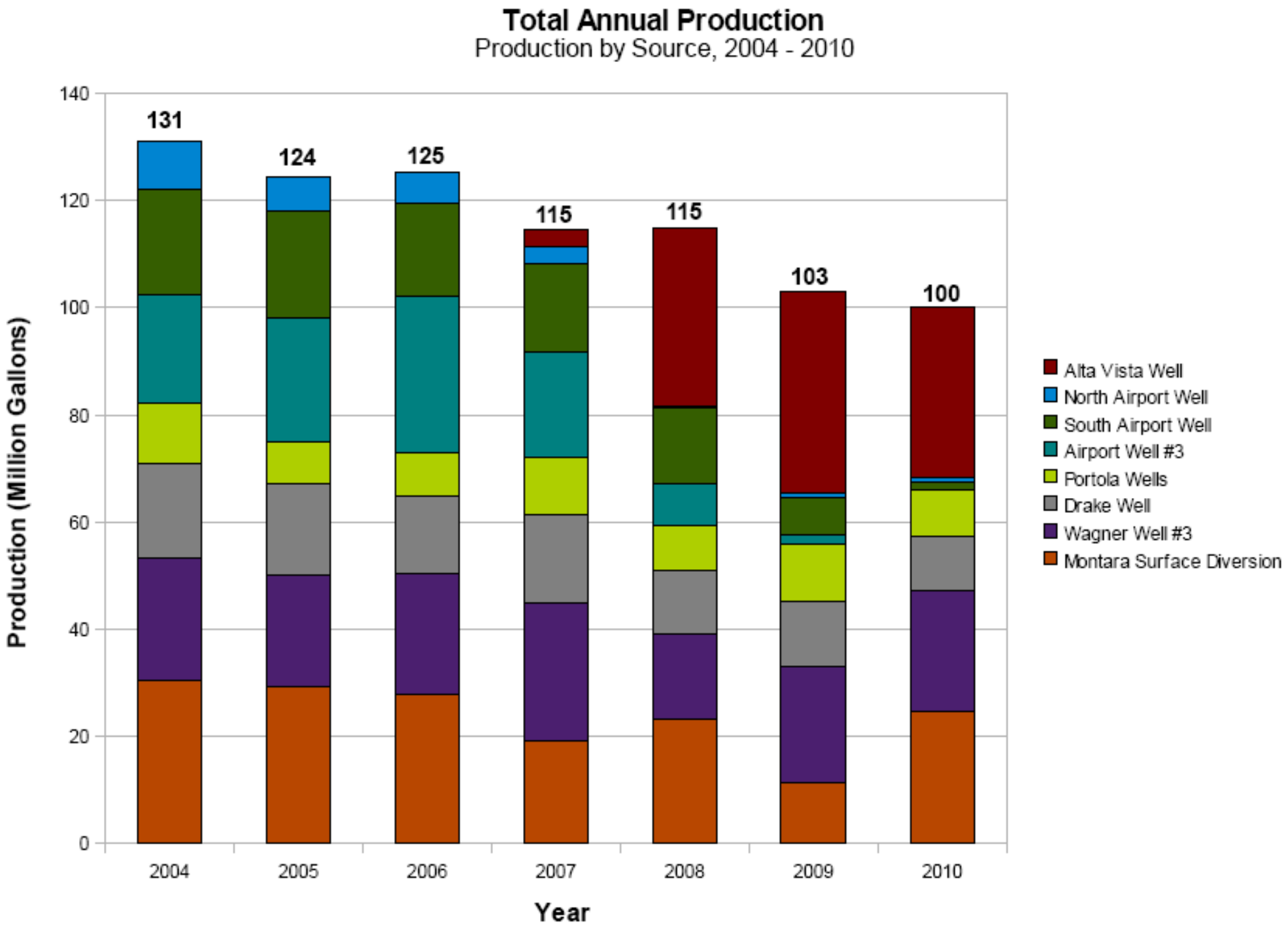


CURRENT WATER SYSTEM OVERVIEW

- **CRITICAL:** The production of MWSD sources are dependent upon the demand on the system
- **Production:** The production of the system is the volume of water that the sources produced and fed into the MWSD system. Production was calculated based on the operator logs for each water source.
  - Used to calculate demand
- **Consumption:** The consumption values represent the actual usage of the MWSD customers. Consumption was calculated based on the billing record summaries.
  - Used to calculate conservation
- **Unaccounted-for-water:** Difference between Production and Consumption; water losses

SUPPLY AND DEMAND OVERVIEW
Production Data Summary
2004 - 2010

- **Average Daily Source Production** 318,418 gpd
- **Maximum Daily Source Production** 473,758 gpd
  - Averaged from actual max day data, 2006-2010
- Production has decreased over the last 7 years
- System Reliability has increased over the last 7 years
  - System-wide improvements
  - Additional supply


Total Annual Production
Production by Source, 2004 - 2010
Production (Million Gallons)
140
120
100
80
60
40
20
0
131
124
125
115
115
103
100
2004
2005
2006
2007
2008
2009
2010
Year
Alta Vista Well
North Airport Well
South Airport Well
Airport Well #3
Portola Wells
Drake Well
Wagner Well #3
Montara Surface Diversion

SUPPLY AND DEMAND OVERVIEW
Production Data Summary

Source	Rated Capacity	Annual Average Production Rate (gpm), 2004 -2007[1]	Annual Average Production Rate (gpm), 2007 -2010
Alta Vista Well	150	N/A	72
North Airport Well	100	46	58
South Airport Well	55	42	35
Airport Well #3	100	73	55
Drake Well	35	37	37
Portola Well #1	9	6	6
Portola Well #3	10	7	6
Portola Well #4	16	6	8
Wagner Well #3	70	58	69
Montara Surface Water	75	63	49
Total	**620**	**344**	**395**

[1]**Production Rates prior to the installation of Alta Vista Well**

SUPPLY AND DEMAND OVERVIEW
2011 Reliable Supply Capacity

Reliable Supply: the total source capacity with the largest source out of service

The Largest Source: Alta Vista Well

Calculation:

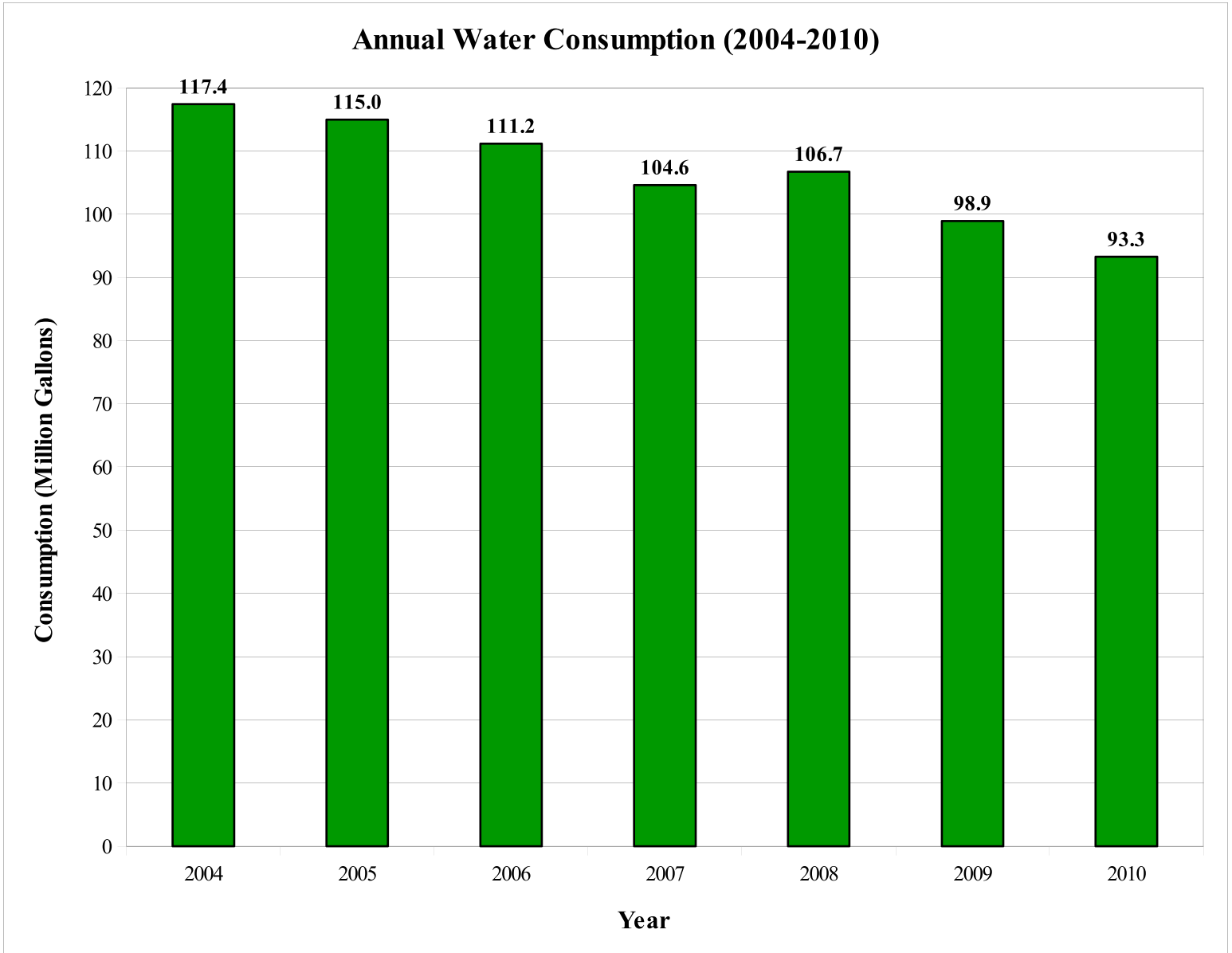
Total source capacity	620 gpm
Alta Vista Well capacity	150 gpm
Total reliable capacity	470 gpm

Calculation Logic:

- Airport Wells are no longer considered a single source, making Alta Vista Well the largest single source

SUPPLY AND DEMAND OVERVIEW
Consumption Data Summary
2004 - 2010

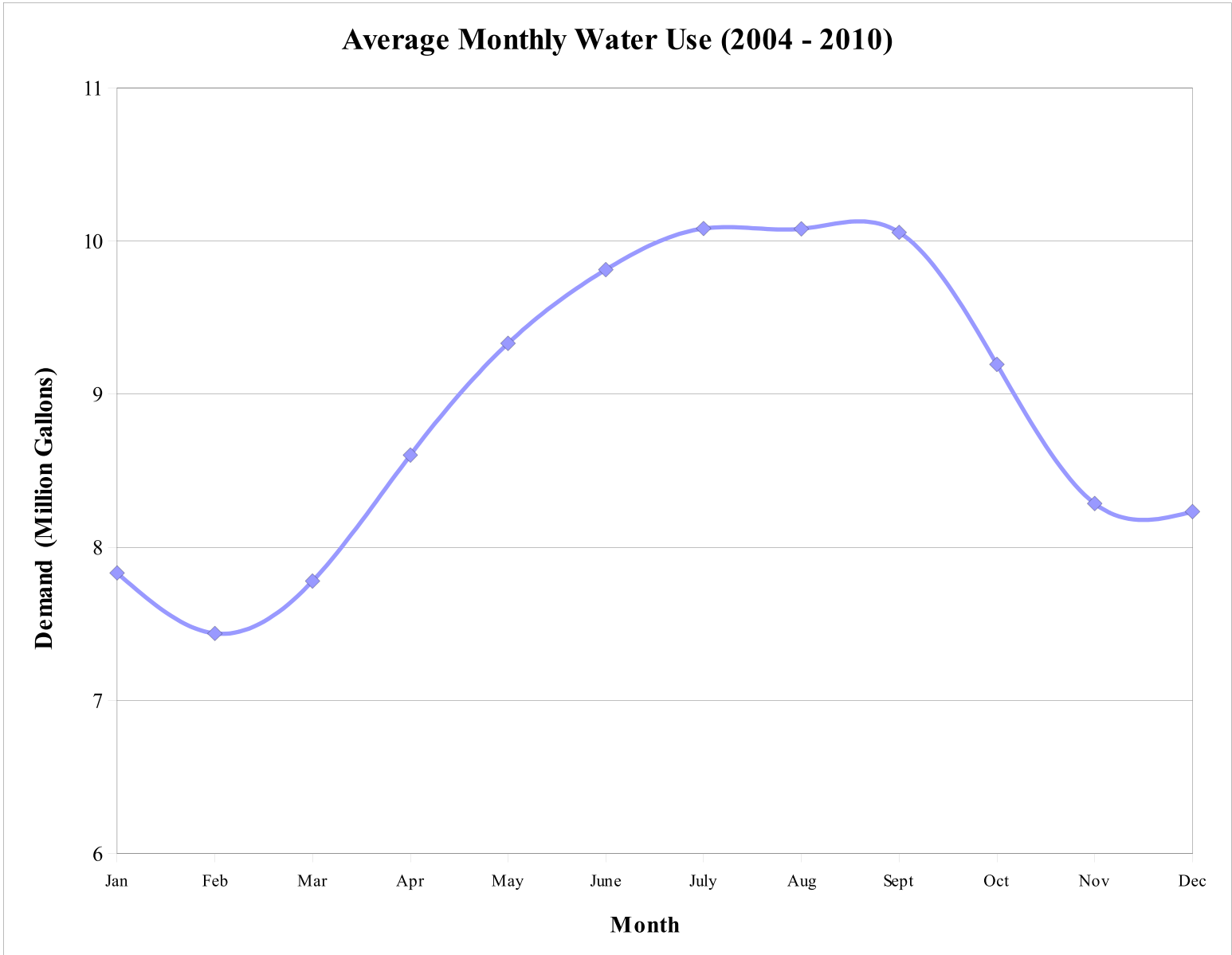
- Average Annual Consumption = 106.73 MG
- Average Daily Water Use = 292,400 gpd



SUPPLY AND DEMAND OVERVIEW

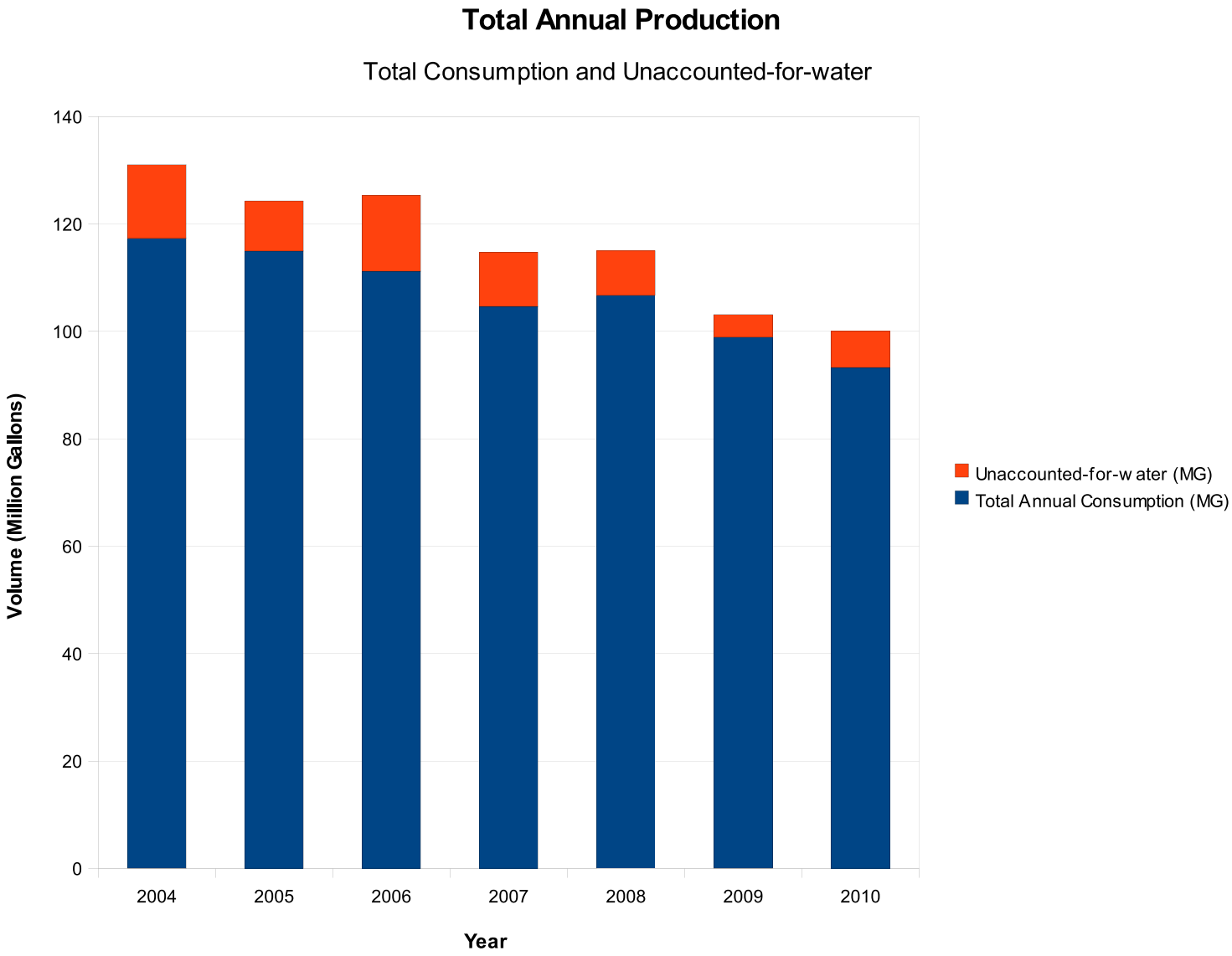
Average Monthly Water Use 2004 - 2010

The driest months of the year, May through October, have the highest consumption volumes on average, most likely due to increases in water used for irrigation.



SUPPLY AND DEMAND OVERVIEW
Unaccounted-for-water, 2004 - 2010

- Decrease due to main and hydrant replacements, other operational uses, water quality improvements, and leak repair
- Average Unaccounted-for-water = 8%
- 2009-2010: Unaccounted-for-water has decreased though flushing frequency has increased



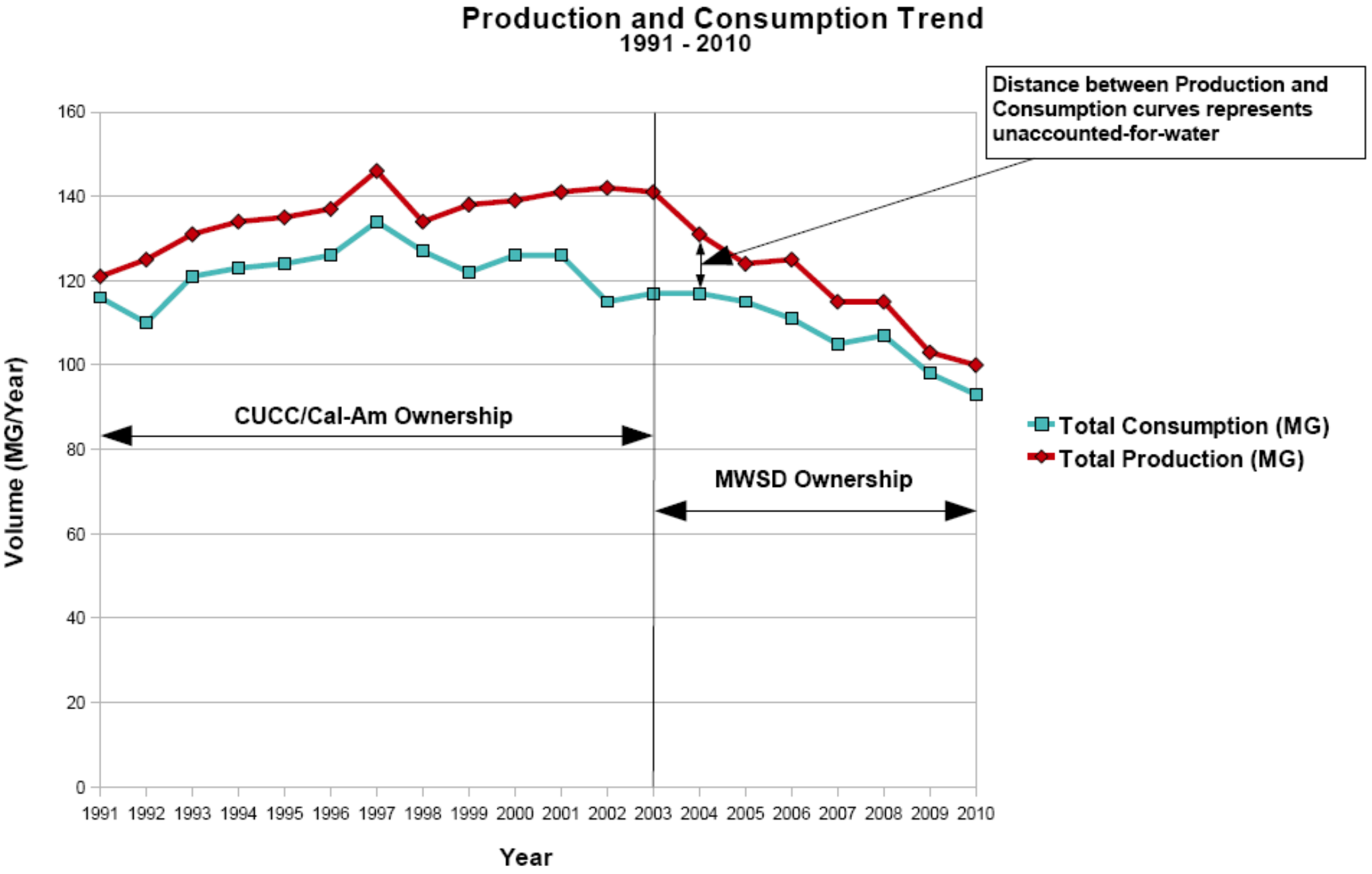
SUPPLY AND DEMAND OVERVIEW

Conservation Efforts Since 2004

- Consumption data from 2004 - 2010 used to calculate conservation
- Annual average conservation = 4% per year
- Total conservation, 2004 – 2010 = 21%
- 21% conservation = ~ 68,000 gpd conserved

Year	Consumption (gpd)	Annual Change (gpd)	Annual Percent Change
2004	321,649	--	--
2005	314,983	- 6,666	- 2%
2006	304,574	- 10,408	- 3%
2007	286,642	-17,932	- 6%
2008	292,393	5,751	2%
2009	271,066	- 21,327	- 7%
2010	254,318	- 16,748	- 6%
Average annual change in consumption			**- 4%**
Total change in consumption (2004 - 2010)			**- 21%**

SUPPLY AND DEMAND OVERVIEW



SUPPLY AND DEMAND OVERVIEW

Demand Analysis

ADD, MDD, and Per Capita Demands

- **Customer demand calculation is based on the production data analysis and includes unaccounted-for-water**
- **Per capita demand was determined from 2000 US Census data, MWSD production records, and water connection records**

Per Capita Demand Calculation	
Average Daily Demand (ADD)	318,418[1]
Maximum Daily Demand (MDD)	473,758[1]
Number of Residential System Connections	1614
Household Size	2.74 people/household[2]
Population Served	4,422 people
Per Capita Demand	**72 gpcd[3]**

[1] Calculated empirically from production records

[2] Based on 2000 census data

[3] The ADD includes the 30 commercial water connections in the service area, so the population absorbs that demand in the per capita demand estimate

SUPPLY AND DEMAND OVERVIEW

Demand Analysis

Existing Population Demands

- Based on the population ***living within District service area***, calculated from the number of sewer connections vs. the number of water connections

Year	Number of Sewer Connections	Number of Water Connections	Number of Houses Not Connected to MWSD	Population not connected to MWSD	Estimated Population within Service Area
2010	1928	1614	314	860	5,283

- ADD = 5,283 people x 72 gpcd = **380,376**
- MDD = ADD x 1.5 = **570,564**

SUPPLY AND DEMAND OVERVIEW

Demand Analysis

Future Population Demands

- Based on 2000 US Census data, MWSD sewer and water connection records, the 2009 DRAFT SM County LCP, and calculated per capita demand

Year	Total Population	Average Annual Rate of Growth	Projected Average Daily Demand	Projected Maximum Daily Demand (gpd)
2000	4,903	--	--	--
2010	5,283	.75	380,376	570,564
2020	5,836	1	420,192	630,288
2030	6,447	1	464,184	696,276
2040	7,121	1	512,712	769,068
2050	7,866	1	566,352	849,528
2060	8,689	1	625,608	938,412
Buildout (2066)	9,215	1	663,480	995,220

SUPPLY AND DEMAND OVERVIEW
Reliable Supply vs. Projected Demands
Summary of Results

- Reliable supply will match projected MDD around the year 2027
- Additional connections can be served with existing supply

Year	Total Reliable Supply (gpd)[1]	Projected Maximum Daily Demand (gpd)	Excess or Deficit Supply (gpd)
2010	676,800	570,564	106,236
2020	676,800	630,288	46,512
2030	676,800	696,276	-19,476
2040	676,800	769,068	-92,268
2050	676,800	849,528	-172,728
2060	676,800	938,412	-261,612
Buildout (2066)	676,800	995,220	-318,420

[1] **Calculated from the reliable supply capacity of 470 gpm for 24 hours**

CAPITAL IMPROVEMENTS PROGRAM (CIP)

- Water Master Plan is a living document conducted every 5 to 10 years.
- One of the results of a Water Master Plan is usually a Capital Improvement Program (CIP)
- A CIP identifies and prioritizes projects that are necessary to ensure a safe and reliable water supply for years to come.
- CIP Projects are usually scheduled according to future need and available budget.

CAPITAL IMPROVEMENTS PROGRAM (CIP)

- CIP Projects are identified different ways:
  - System Calculations / Deficiency Analysis
  - Infrastructure Inspection and Assessment
  - Operator Interviews
  - Redundancy Review
  - Hydraulic Computer Modeling – Distribution System Analysis

CAPITAL IMPROVEMENTS PROGRAM
Distribution System Analysis

- Model utilizes Navier Stokes equations to mathematically simulate the water system.
- Once calibrated, the model can be used to test system stress, such as fire flows, peak hour demands, and future demands.
- Model results such as high pipeline velocity or headloss, or low/high node pressures, can help identify areas in need of improvement.
- System capacity can be improved dramatically by merely replacing aged pipes.

CAPITAL IMPROVEMENTS PROGRAM

- Schoolhouse Booster Pump Station Upgrade
- Main Replacements
- Wagner Well Pump Upgrade
- PRV and Valve Installation Program

CAPITAL IMPROVEMENTS PROGRAM

- Develop Additional Supply Reliability
- Portola Tank Telemetry Upgrade
- SCADA Improvements
- Treatment Upgrades

SUMMARY

- Since acquisition of the Water System, MWSD has made system improvements, promoted community conservation, and acquired a new source
- Data analysis of MWSD water production and consumption records provided important information on current and future water demand trends
- Due to system improvements, conservation, and additional supply sources, MWSD has water available in excess of current demands


END OF PRESENTATION