



PNWS-AWWA Conference, May 8-10, 2013 – Spokane, WA

Evolution of Source Water Appropriation at the City of Walla Walla – A Conjunctive Use Approach



Presentation Overview



- Community Background
- Water System – Surface Water and Groundwater
- Hydropower
- Recycled Water
- Supply and Demand Projections
- Groundwater and ASR Operations



Background of Walla Walla



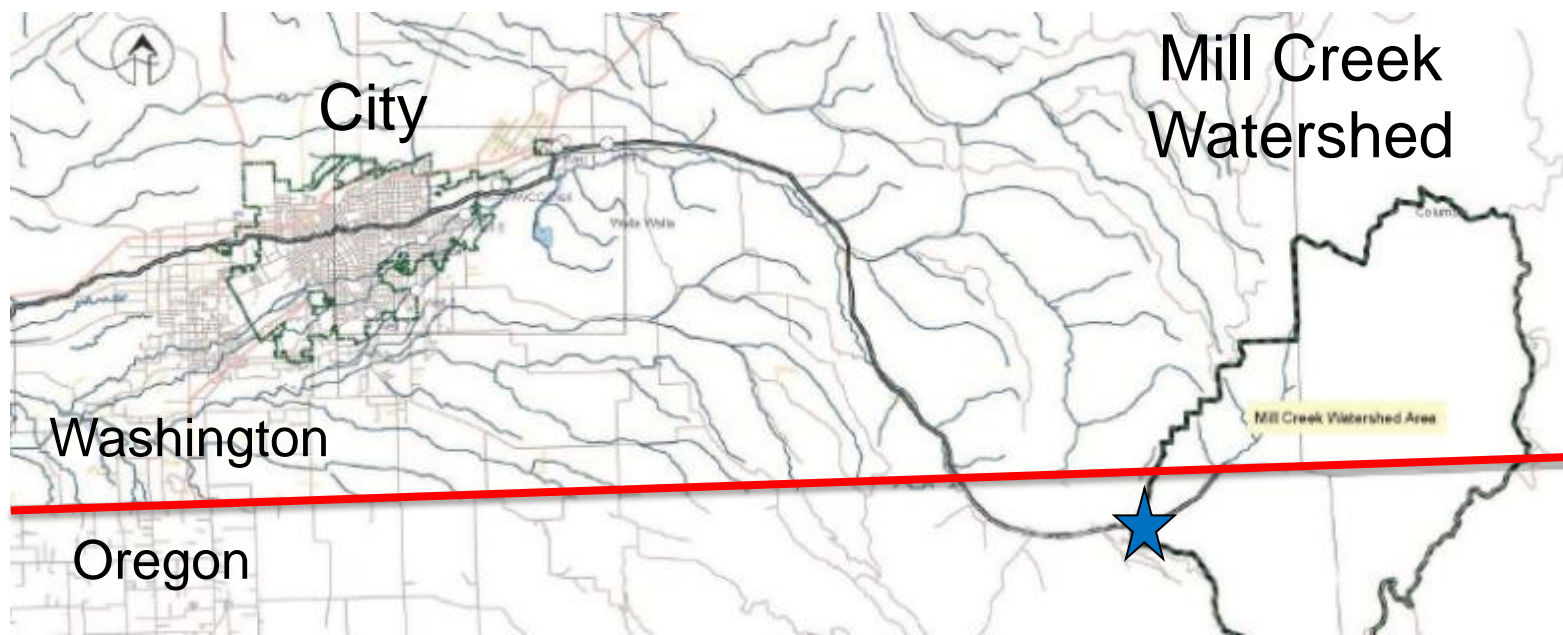
- Founded in 1862
- City population of 32,000
- Service population of 34,000
- Approximately 10,500 connections
 - 9,100 single family connections
 - 150 multi-family
 - Remaining 1,200 are commercial/industrial
- Main industries
 - Agriculture
 - Corrections facility
 - Wine industry



Water System



- Started off as a surface water system in 1906
- Uncommon feature is that the intake is Mill Creek in Oregon
 - Moved into Oregon in 1922
 - City holds two Oregon surface water rights
 - Treatment started as sedimentation/chlorination.



Groundwater Use



- Population growth put a strain on Mill Creek water supply.
- City started drilling wells to meet peak demand and back-up for drought management.
- Seven wells added between 1940s and 1960s.
- Aquifer storage and recovery (ASR) program started in 1999.



Hydropower



- Hydropower installed on Mill Creek pipeline in 1980s.
 - 2.2 MW Pelton wheel generator
 - Water from generator goes into treatment plant or diverted back into Mill Creek.
- Power generation is a major funding source for City
- Emphasis on Mill Creek use
- Now constrained by in-stream fish flows



Water Supply Portfolio



Source	Water Right (MGD)	Current Capacity (MGD)
Mill Creek	31	24
Well No. 1 (ASR)	3.6	3.6
Well No. 2	2.6	2.5
Well No. 3	5.8	4.1
Well No. 4	4.0	4.0
Well No. 5	2.4	2.0
Well No. 6 (ASR)	3.7	3.8
Well No. 7 (Emergency)	4.3	4.3
WW Comm. College Well	1.4	1.6
Total	59.0	49.7



Recycled Water



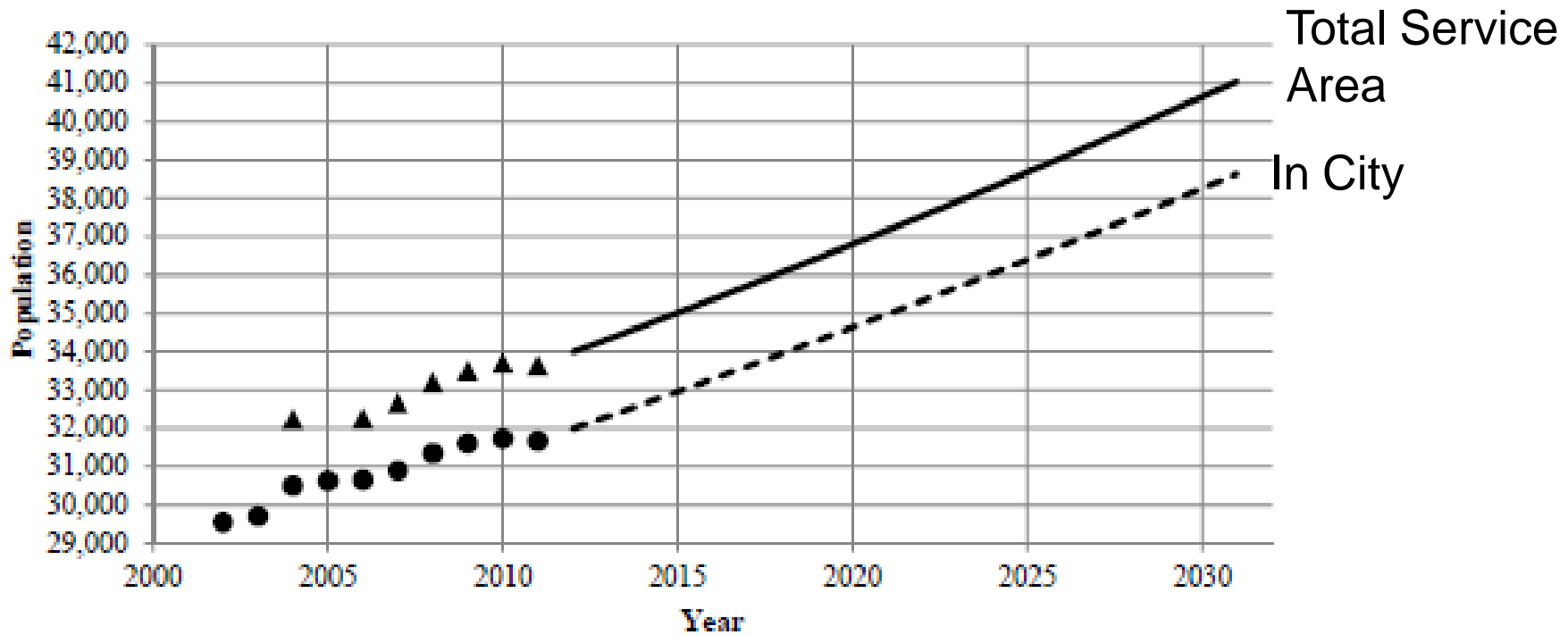
- City wastewater plant practices 100% water recycling for part of the year
- Land irrigation for 7 months – Gose and Blalock Irrigation Districts
- Recycling stopped in winter and spring
 - Lack of demand
 - To further enhance spring flows for fish in Mill Creek



Supply/Demand Forecasts



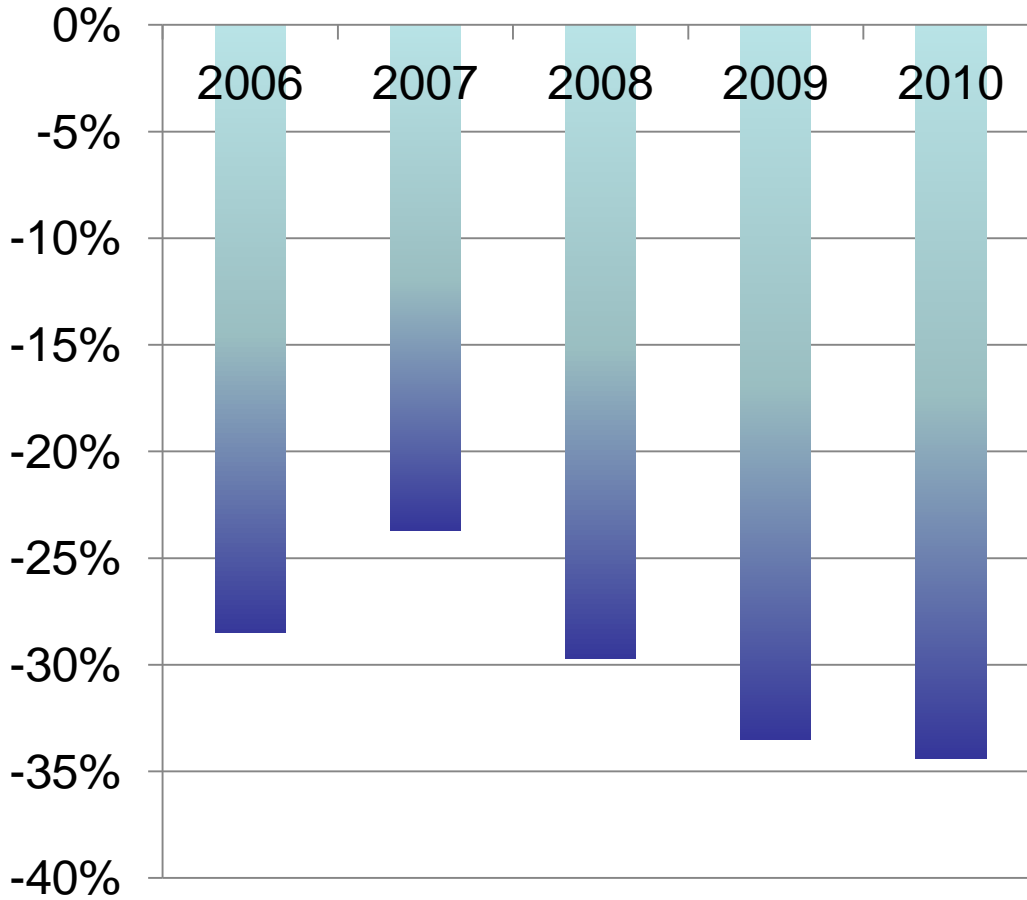
- Compounded population growth at 1% per year



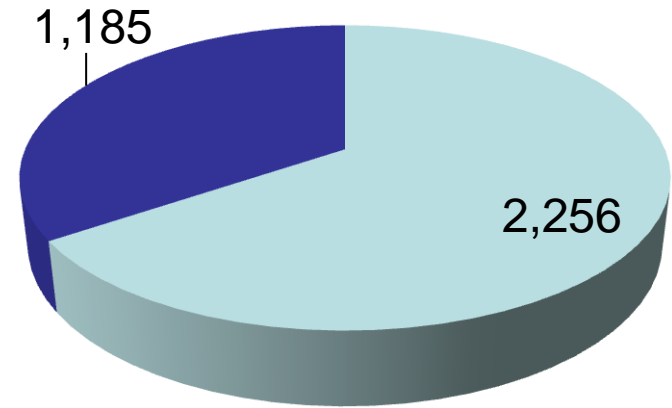
Water Loss



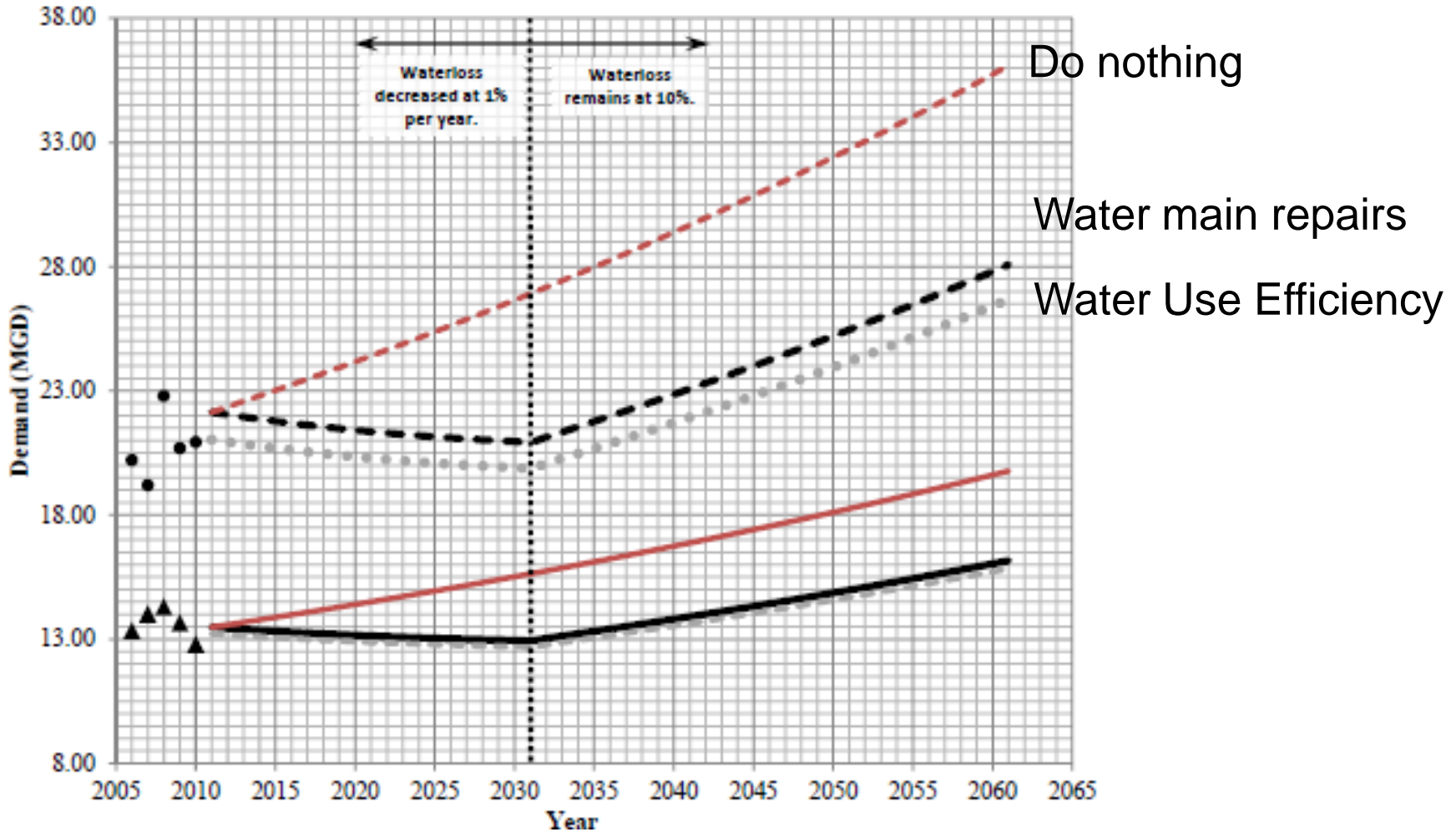
Annual Water Loss



2010 Production (MG)



Projected Water Demand



City's Future



- Intensive loss prevention program
 - Water main replacement program
 - Leak identification and repair
- Meter replacement program
- Water treatment plant upgrade for LT2 compliance

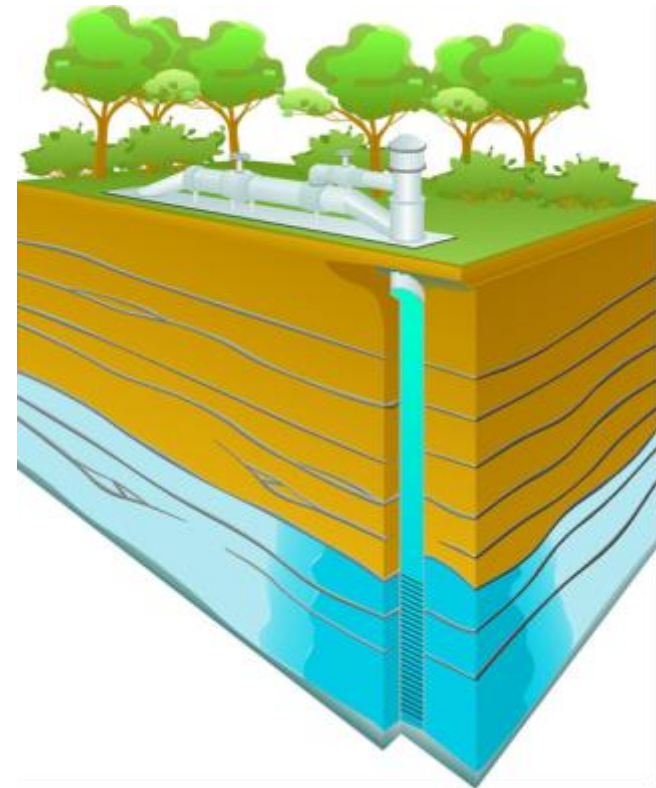
- Expanding ASR program



Walla Walla Groundwater System



- Seven wells developed over time to supply expanding City and augment Mill Creek
- Deep wells (~1,000 feet +/-) tap Columbia River Basalt
- Capacity 1,500 to 2,800 gallons per minute
- Typically seasonal use – winter turbidity or summer low flows
- Expanded to include two ASR wells (No. 1 and No. 6) in 1999 to 2003



Decision Behind ASR for Walla Walla

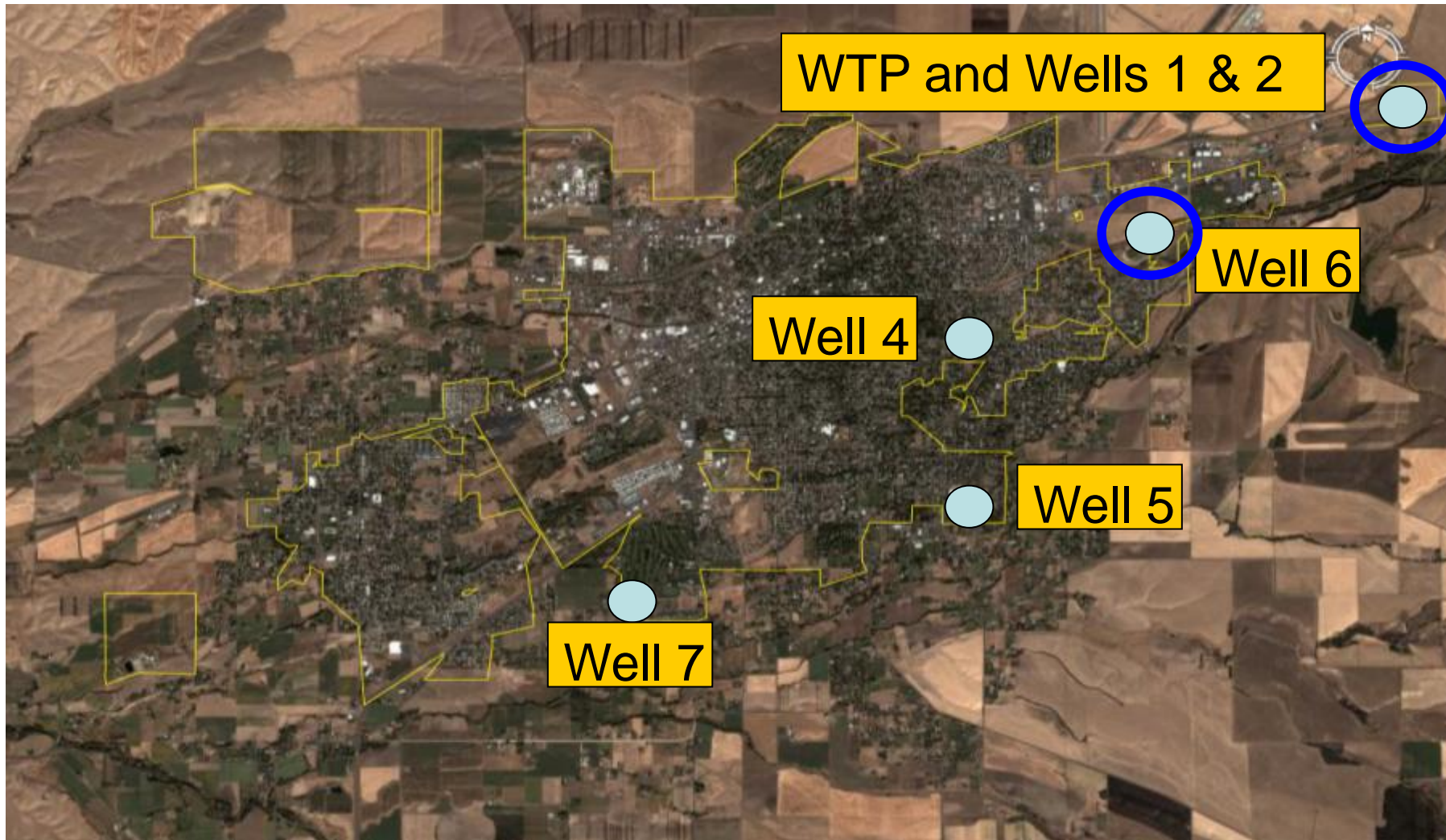


- Existing wells and infrastructure in place
- High quality surface source seasonally available
- Observed long-term decline in groundwater levels in basalt aquifer
- Redundancy and reliability of surface water source

- ASR program planned to:
 - Reverse declining groundwater levels in the basalt aquifer
 - Provide peaking water supply
 - Minimize summer impacts on Mill Creek
 - Provide emergency supply in case of adverse turbidity or fire in watershed



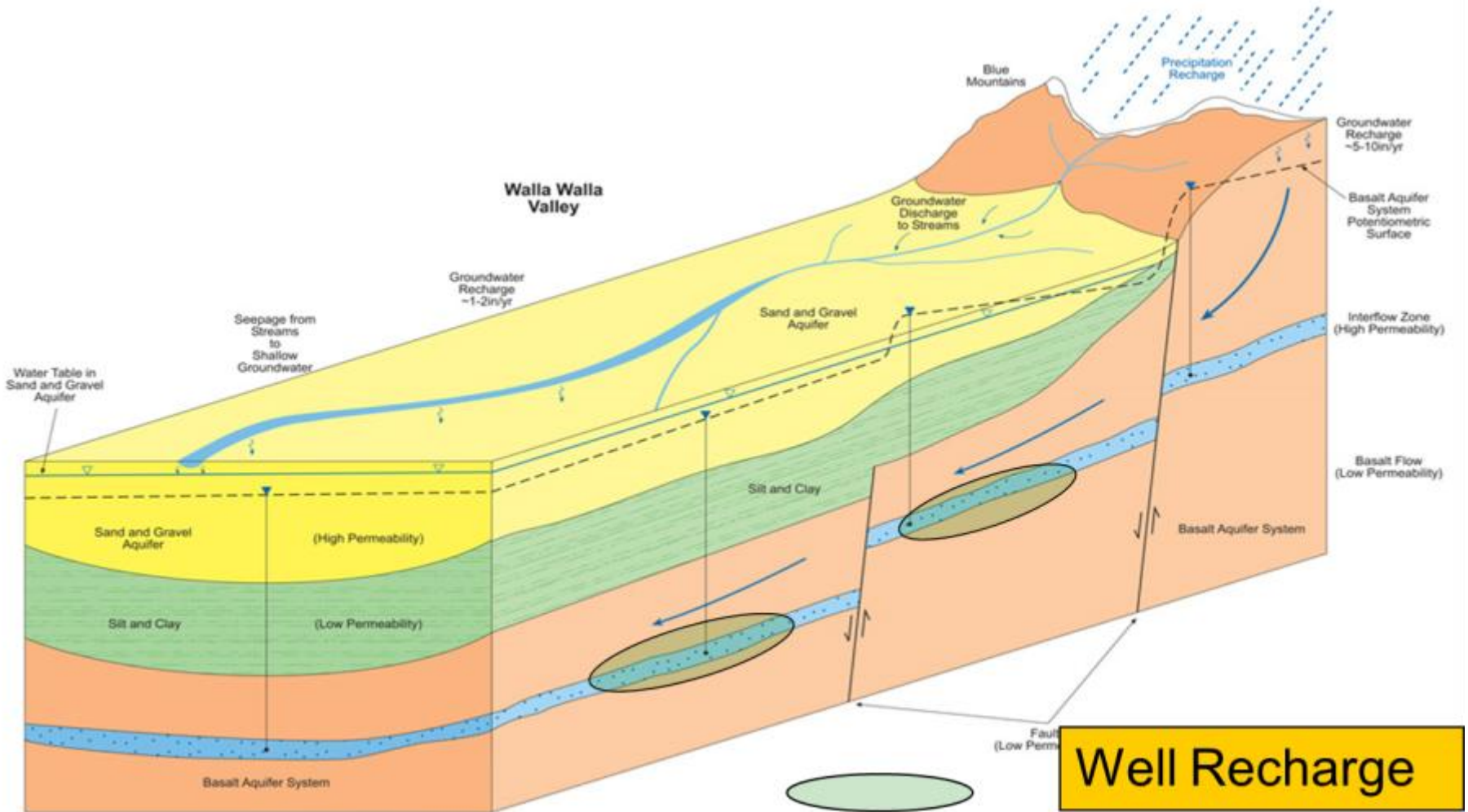
Walla Walla Groundwater System



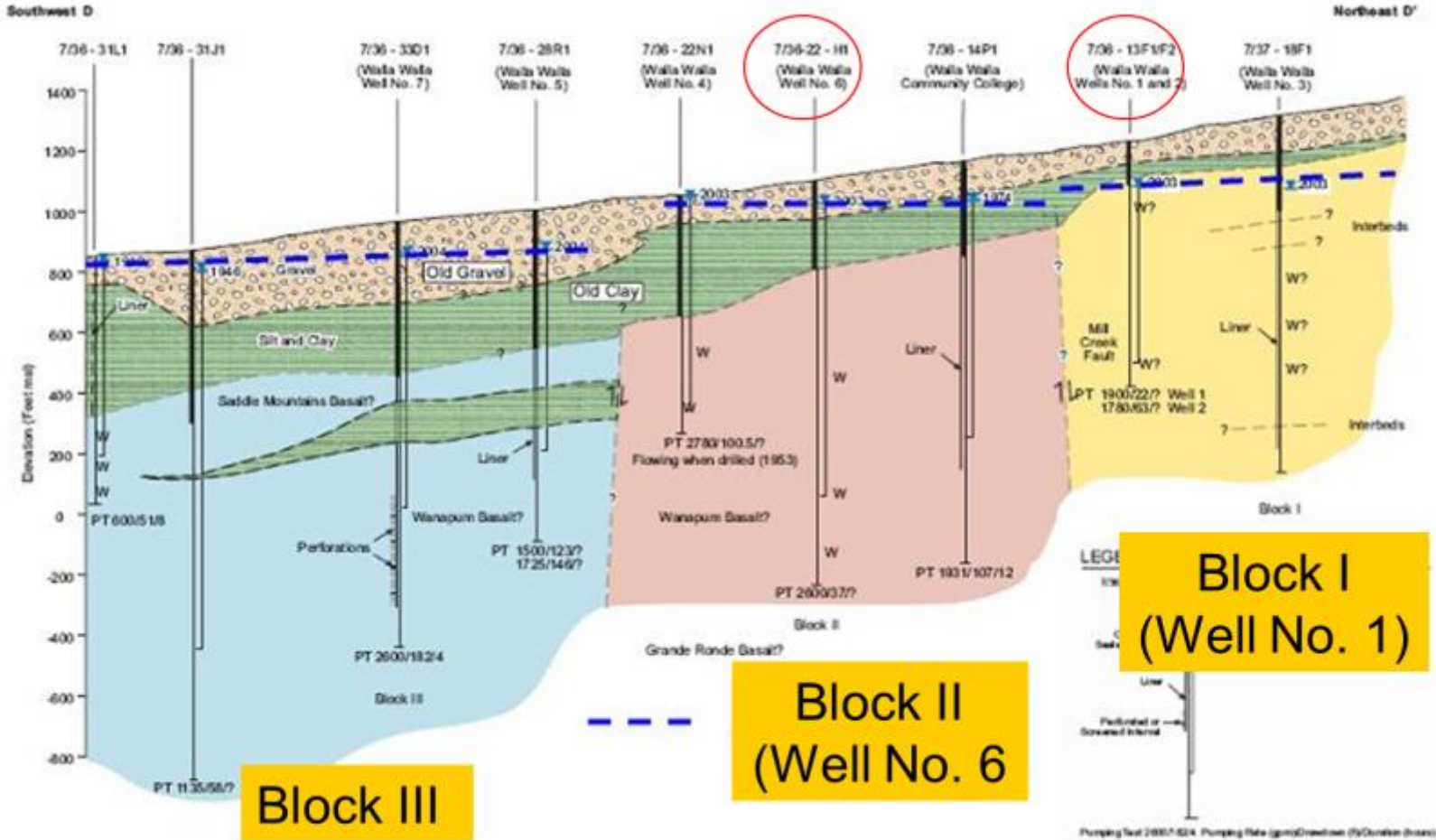
Two ASR Wells



Conceptual Hydrogeology in Walla Walla



Walla Walla Hydrogeology



Basalt Rock Types and Storage



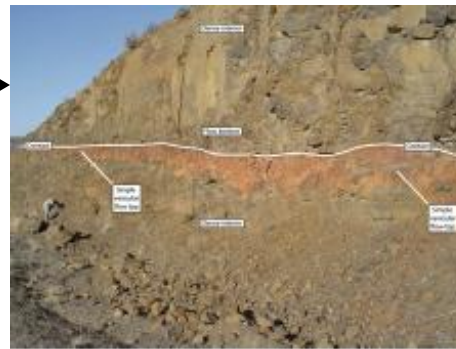
Pillow Complex –
Flow Bottom

Entablature –
Flow Interior

Flow Top

Columnar Basalt
– Flow Interior

Flow Top Breccia



Source: GWMA, 2009



City of Walla Walla - Permitting



- Completed testing according to other states' regulations while communicating progress with Ecology
 - Obtained UIC permits for ASR wells
 - Ecology review of testing plans
 - DOH review of wellhead modifications

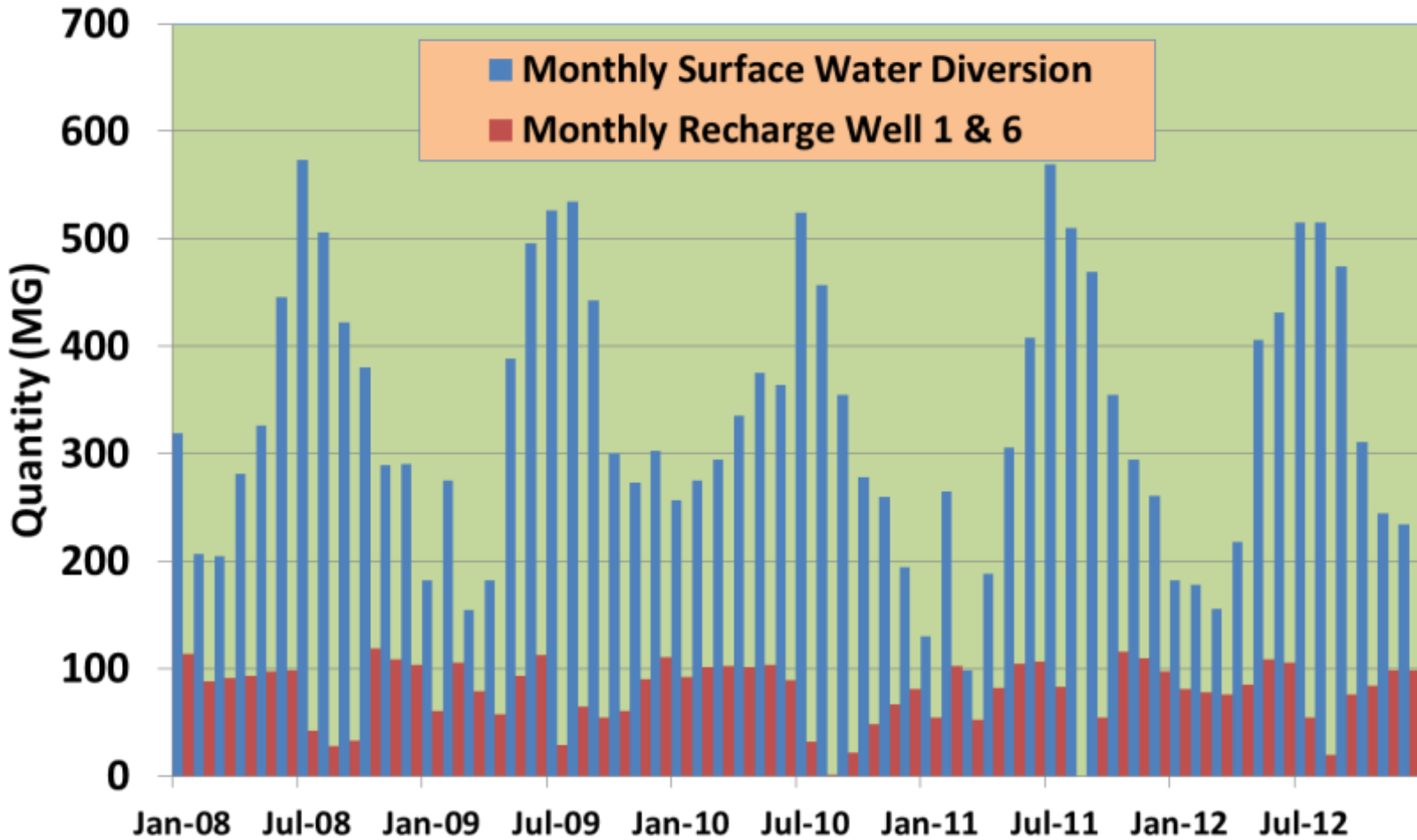
- Retrofit two existing wells to allow ASR capability
 - No adverse water quality effects since ASR program started
 - Fully operational since 2002

- Submitted Reservoir Permit Application in 2009

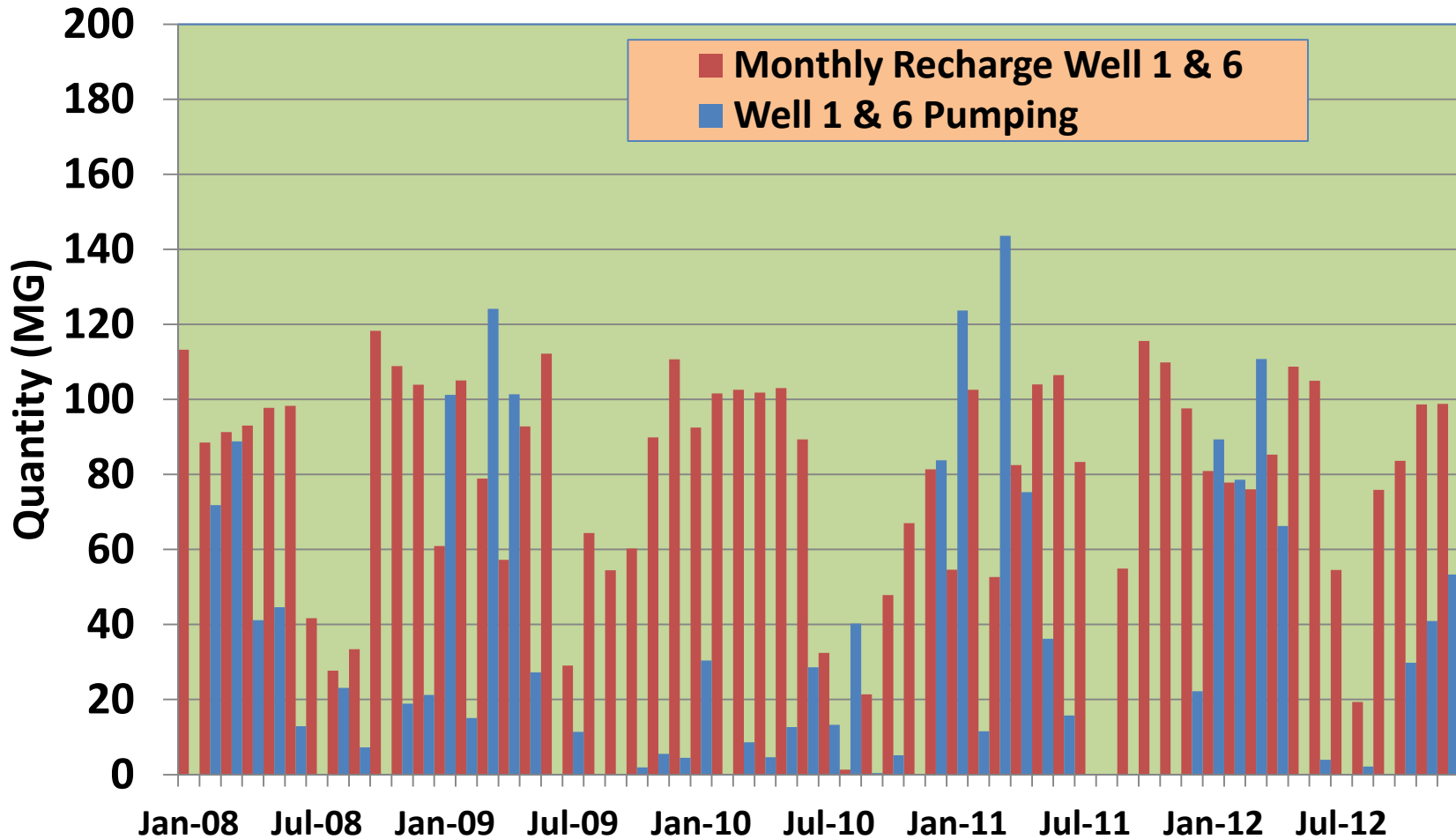
- Waiting for Ecology approval



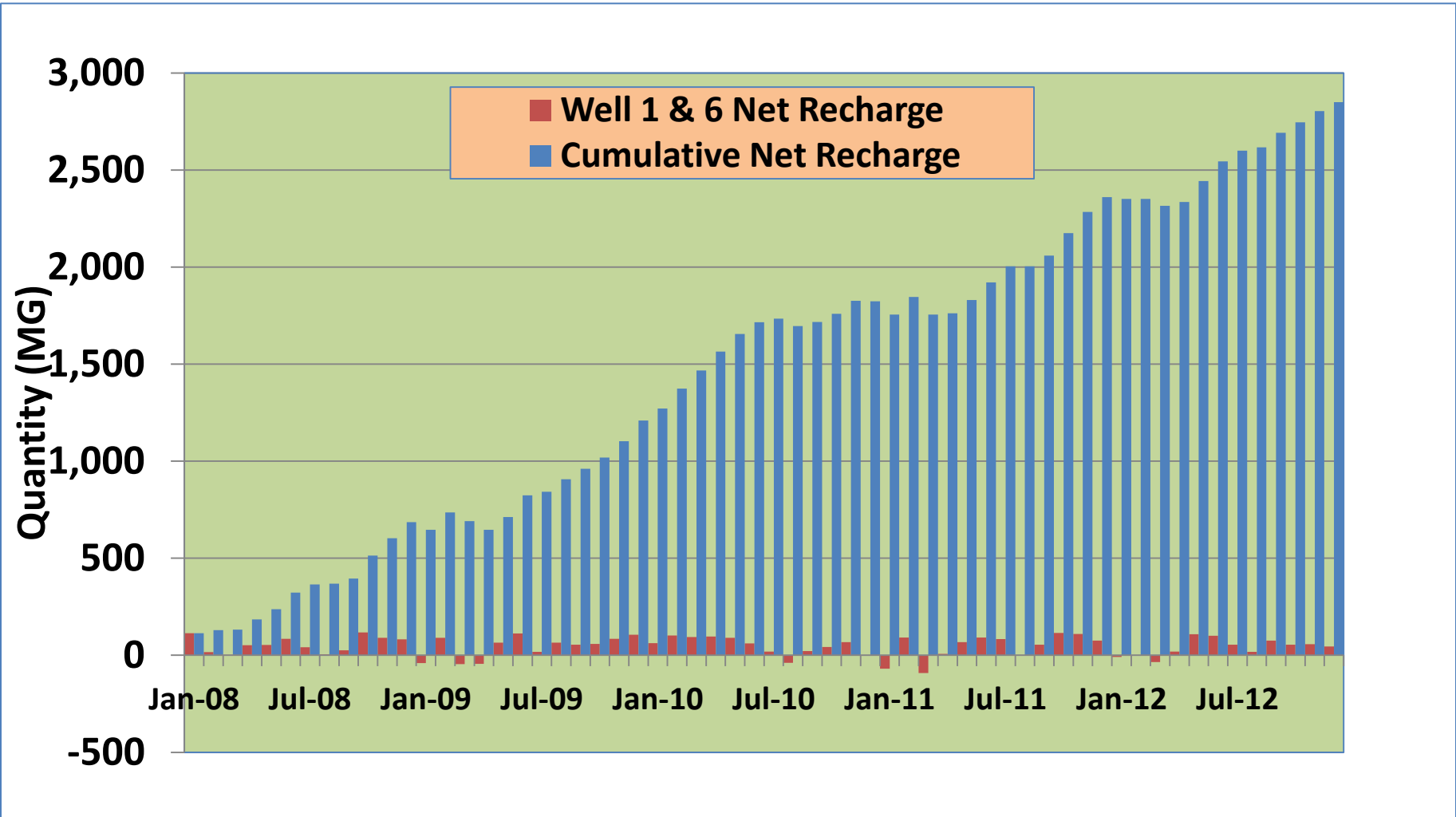
Walla Walla ASR Operations



Walla Walla ASR Operations



Walla Walla ASR Operations



Summary



- Conjunctive use of surface water and groundwater benefits the environment and local community
- Hydropower and Recycled water systems provide community benefits
- Surface water maximized during spring and early summer
- Groundwater use maximized during summer and fall and is used during high turbidity periods in the fall and winter
- ASR provides opportunity for increased groundwater use and additional storage and emergency supply
- Overall benefits to Mill Creek and other local surface water sources

