Welcome to
YAKIMA
The Palm Springs
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Water Supply Curtailment Issues and Aquifer Storage and Recovery for Sustainable Supply

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Outline

- City of Yakima responsibilities, situation
- Basin water supply issues
- City of Yakima water supply details
- ASR as a potential solution
- Challenges to realizing that solution

City of Yakima Responsibilities, Situation

- Water Service Population: 65,000
- Staff: 30
- Manager-Council government
- Run separate irrigation and potable systems

City of Yakima

Water Supply Responsibilities

DEMAND = SUPPLY (25 mgd)

EMERGENCY GROUNDWATER BACKUP

(limited replacement only – 3-5 days – not additive)

PLANNING

- How to meet extended emergency demands? (e.g., >5 days)
- How do we meet growth?

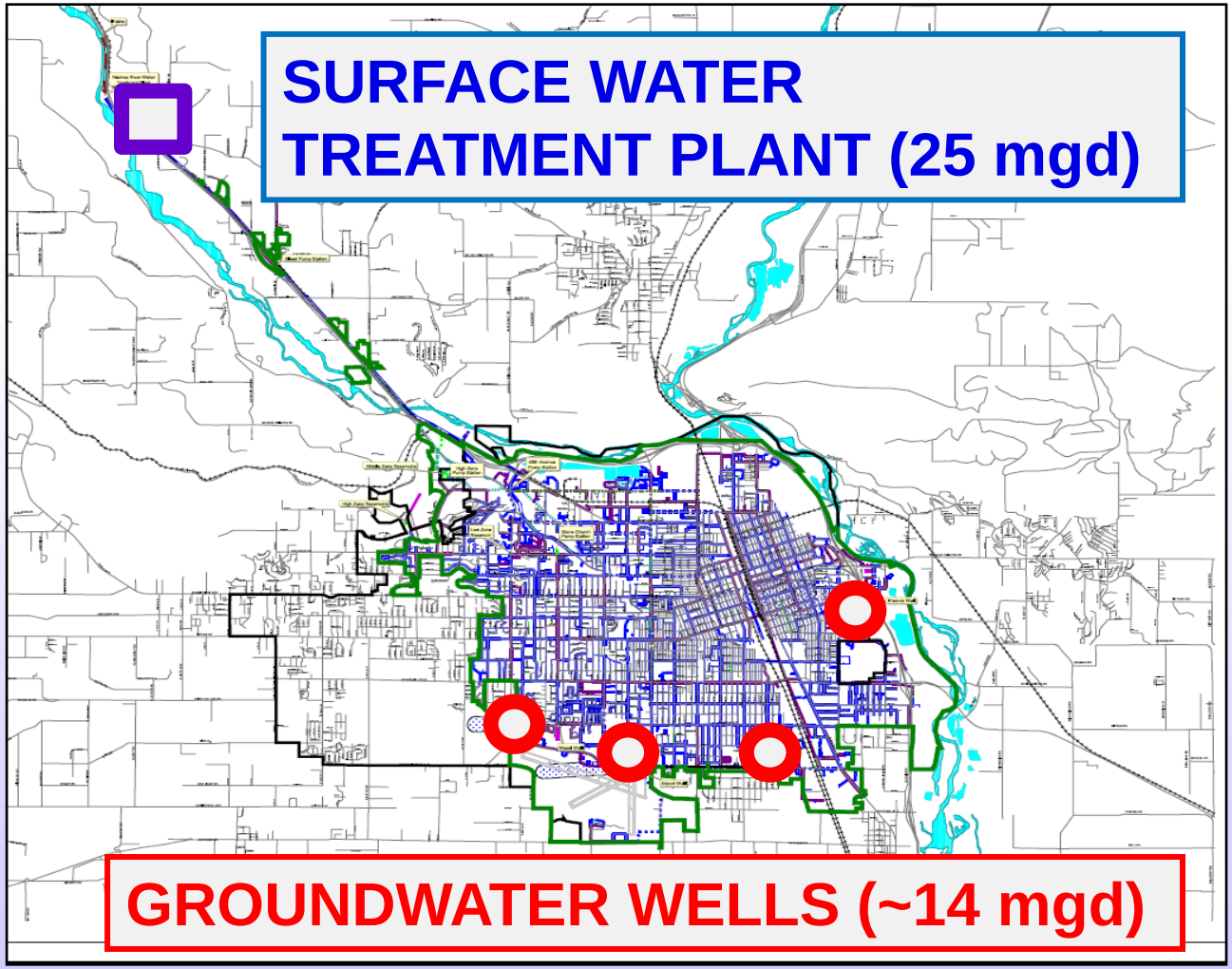
City of Yakima

Situation

- Complex water right portfolio
- Needs: - Emergency/drought supply
  - Future demand
- Supplies: - Surface water
  - Groundwater
  - Connected by distribution system
- Challenges:
  - **Paradigm change** (regulatory & climate)
- ASR is a possible solution

City of Yakima

Water Supply



5 miles

Surface Water Supply

- Naches River – 25 MGD capacity
- Interruptible by:
  - Operational issues (ice, flooding, turbidity…)
  - Water right curtailment (drought years)

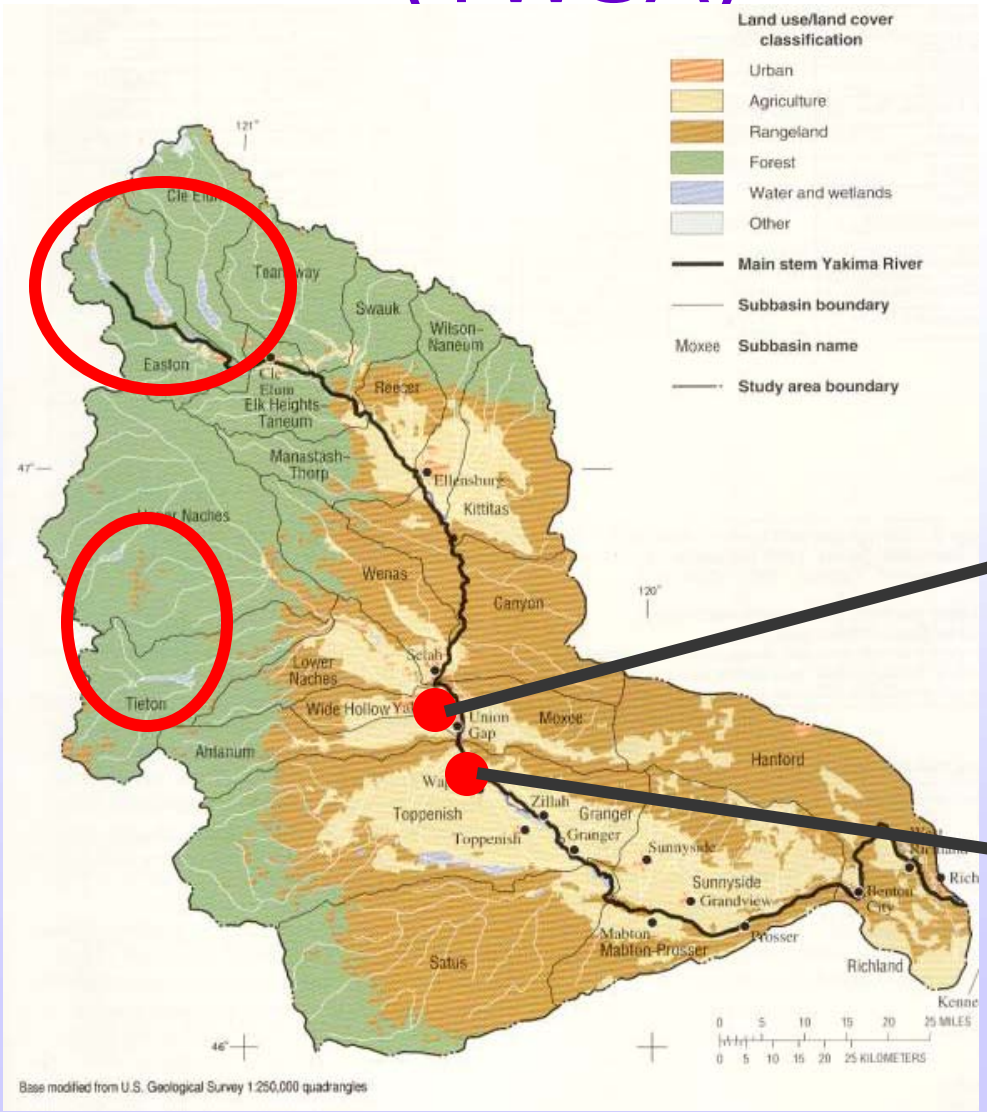
Emergency Groundwater Supply

- 14 MGD capacity
- Limited by:
  - Installed wells
  - Groundwater rights (non-additive, emergency use)

Total Water Supply Available (TWSA)

Upper basin reservoirs

Lower basin reservoirs



City of Yakima

Parker Gage @ Sunnyside Dam

Basin Water Right Issues

- 3 classes of rights
  1. Senior rights
  2. Bureau rights (May 10, 1905)
  3. Junior rights

  } Pro-ratable/ Interruptible

- Pro-ratable/interruptible controlled by: **Total Water Supply Available** (TWSA)

  (Effectively from April-Sept.)

City of Yakima has all classes of rights

Basin Senior Rights

- Pre-May 10, 1905 – almost certain supply.
- Some Juniors say Senior rights would not be available if there was no storage
  - Rivers and creeks would have less flow
  - Stored water enables senior right holders
  - Should senior right holders help pay for storage costs?
- All other rights (contract & junior) are interruptible.

City of Yakima has Senior rights

Basin Contract Rights

(May 10, 1905)

- Bureau withdrew all remaining surface water in Basin for the Yakima Project
- **<u>Ecology kept issuing rights…</u>**

City of Yakima has Contract water

Junior Water

- All water rights issued after May 10, 1905, as well as contract water
- Most groundwater rights were issued after May 10, 1905
- Subject to pro-ration/interruptible

City of Yakima has Junior water

Total Water Supply Available

May 1, 2010 TWSA ESTIMATE				
May 1 - September 30				
Parameter*	**+/-/=**	**Low**	**Likely**	**High**
May 1-Sep 30 Natural Flow at Parker est.	+	900	1089	1289
Return Flow Estimate	+	290	300	310
May 1, Reservoir Content	+	684	684	684
TWSA	=	**1874**	**2074**	**2283**
SEP 30 EST RESERVOIR CONTENT	-	76	76	76
FLOW OVER SUNNYSIDE DAM	-	160	190	250
TWSA FOR IRRIGATION	=	1638	1808	1957
NONPRORATABLE ENTITLEMENT	-	909	909	909
REMAINING TWSA	=	729	899	1048
PRORATABLE ENTITLEMENT		1145	1145	1145
% RATIO= REMAINING TWSA/PRORATABLE ENTITLEMENT		**64%**	**78%**	**92%**
TITLE 12 FLOW REQUIREMENTS, cfs		300	300	300
Total Parker Target FLOW, cfs *#*	**May**	**332**	**334**	**335**
*Values are in 1,000 ac-ft unless otherwise specified.				
# State & YRBWEP Trust, Acquisition, & Conservation additions to Title XII flow range from 32 to 37 cfs.				

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Drought

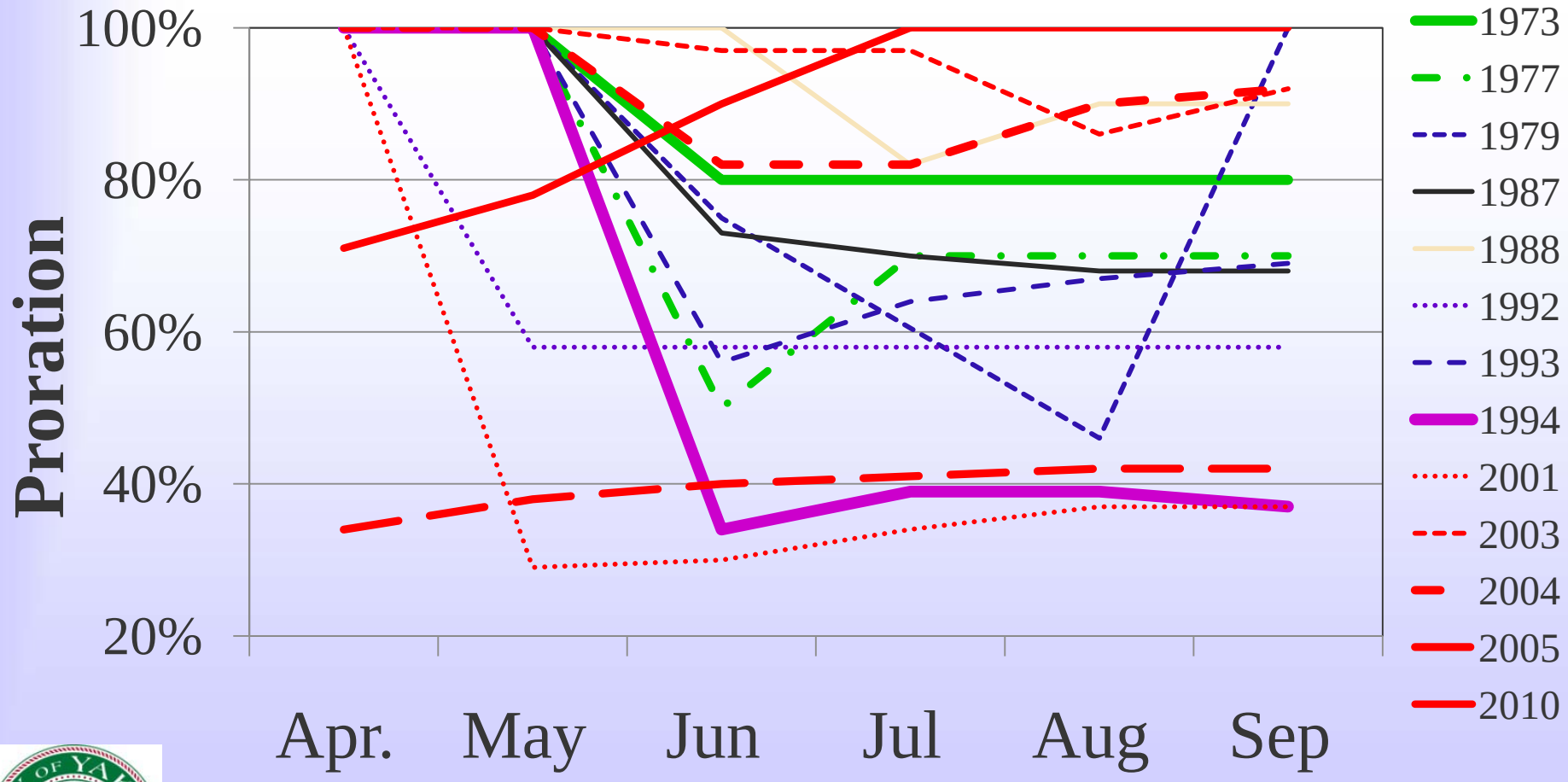
Gordon King, Yakima Herald Republic

Drought

Year	Start of Proration Period	Storage Control Date	Apr	May	Jun	Jul	Aug	Sep
1973	10-Jun	1-May			80%	80%	80%	80%
1977	1-Apr	1-Apr			50%	70%	70%	70%
1979	1-Jul	20-Apr			75%	75-46%	46%	100%
1987	1-Jun	20-May			73%	70%	68%	68%
1988	1-Jul	24-Jun				82%	90%	90%
1992	17-May	17-May		58%	58%	58%	58%	58%
1993	1-Jun	13-Jun			56%	64%	67%	71-67%
1994	1-May	1-Jun			34%	39%	39%	37%
2001	1-May	1-Jun		29%	30%	34%	37%	37%
2003	1-Aug	20-Jun			97%	97%	86%	92%
2004	16-Jun	16-Jun			82%	82%	90%	92%
2005	6-Apr	25-May	34%	38%	40%	41%	42%	42%
2010	1-Apr	3-Jul	71%	78%	90%	100%		

Drought/Pro-Rationing

(every 5 years since 1973; every 2 years since 2000)

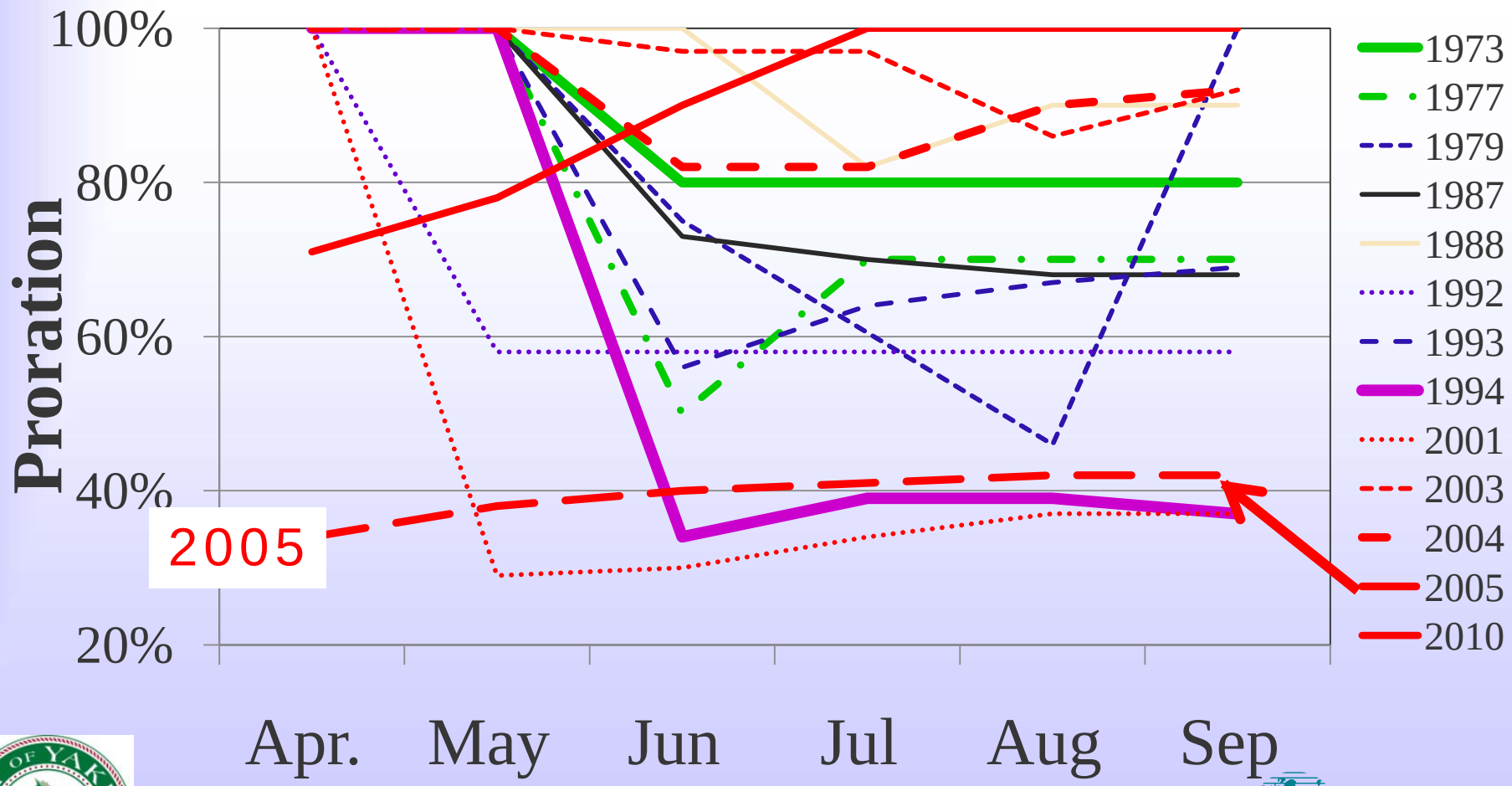


City Water Right Operations

- Has all 3 classes of surface water rights:
  - Pre-1905 Senior
  - 1905 Contract Water
  - Post-1905 Junior
- Mix and match, manage with emergency groundwater rights
- Sophisticated management, but… increasingly difficult to achieve – hitting the envelope

Drought/Pro-Rationing

(every 5 years since 1973; every 2 years since 2000)



Meeting Current Demand

2005 Drought (not a bad year)**:**

- April 6: Drought declared
  - Post-1905 water shut off, Post-1905 curtailment order
- May 25: Storage Control declared
  - Post-1905 water not available and Bureau of Reclamation water not available till May 25
- For 48 days the City only had access to 10 cfs of surface water rights
  - Depended heavily on groundwater sources
  - Post-1905 curtailment order curtailed all other junior surface water

Problem

- Drought years happening more frequently
- Emergency groundwater rights do not provide adequate coverage
- No water right capacity for growth
- New rights available only for:
  - Significant environmental benefit
  - Non-consumptive
  - Water balance neutral
  - Water market (e.g., $1,000-$10,000/afy)

What has Changed

1. Post-1905 curtailment order

2. Climate Change (real)
   Droughts occurring more frequently

3. USGS Ground Water Study
   (perception correction)

1. Post-1905 Curtailment

- The curtailment order mandates curtailment in water short years
  - Creates some situations where the city cannot access their Bureau contract water for 15 to 50 days
  - We can not meet demand even with drastic conservation measures.
- Surface water only
  - Today, what does the future hold

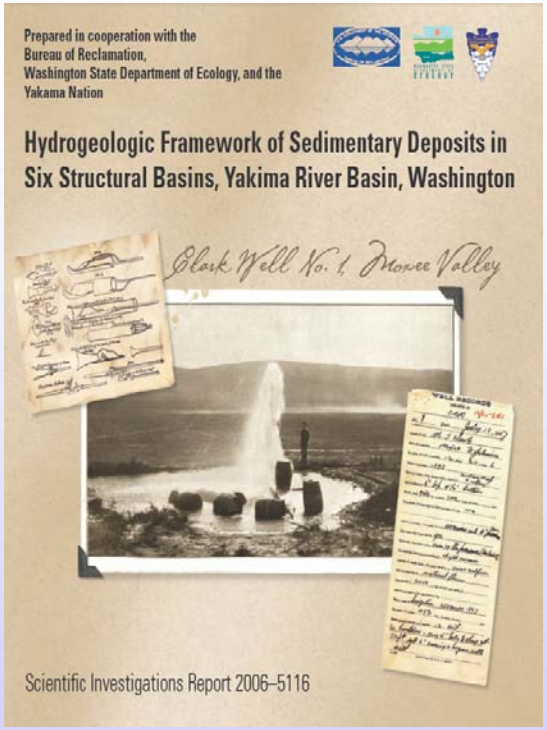
2. Climate Change (real)

- Yakima will see more rain and less snow
- We are losing 1 of our reservoirs (snow pack)
- Not enough conventional reservoir capacity to store runoff

3. USGS Groundwater Study

(perception correction)

- ~10 year USGS study
- Groundwater and surface water connected, **well duh!**
- Groundwater rights may be curtailed in future
- <u>Everyone must reconsider reliance on groundwater supply</u>



Meeting Future Demands

- Need water to meet growth and climate change
- New conventional water rights: not an option
- Emergency groundwater rights: stop-gap measure
  - City has winter capacity (rights & infrastructure)

Solution: Move Winter Capacity to Summer with **ASR**

ASR

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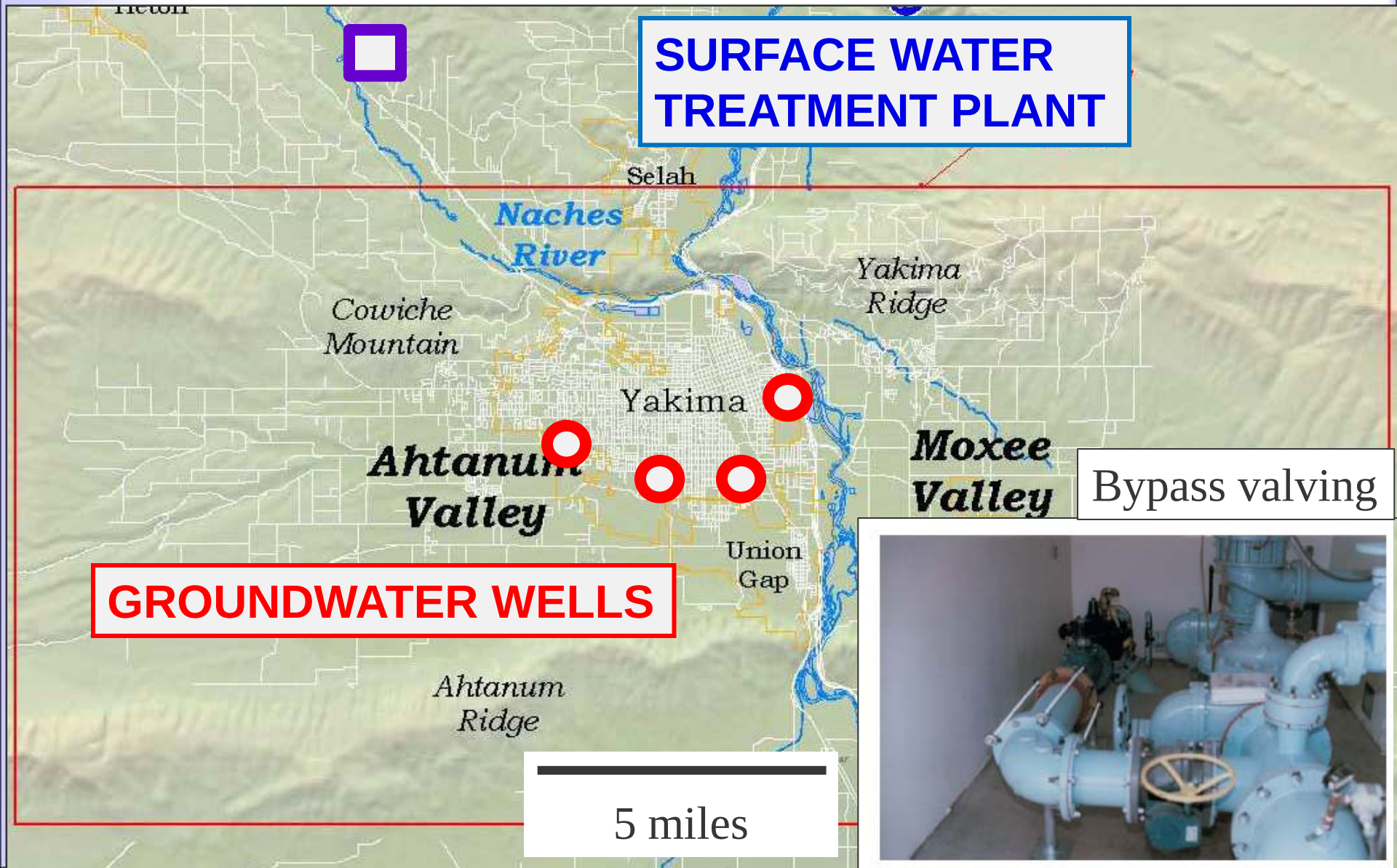
ASR to Extend Supply



ASR Feasibility

- Winter water rights are available for ASR
- Pilot study & modeling:
  - >90% of recharged water is available after 1 year
  - ~60% after 10 years
- Water quality is very compatible
- Clogging of wells by system scale is reversible

Bypass valving

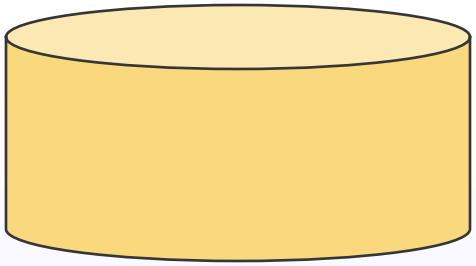
ASR Implementation

- Recharge every winter (minimal cost)
- Withdraw in summer droughts (every 1-5 years?)
- Not all years will be droughts
- Water not withdrawn will be banked

- Any unrecovered water will provide societal benefits (environmental, other groundwater users)

ASR & Operations

- Storage needed for fire flow



- Conventional new storage:
  - ~$2M
  - ~2 million gallons

- ASR (per well):
  - ~$2M
  - ~400 million gallons

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ASR Costs

- <u>Conventional water costs:</u>
  - Water right: **$1,000-$10,000**/afy (water market)
  - Seasonal storage: **$5,000/af** (Black Rock)
  - Infrastructure storage: **$2M**

- <u>ASR costs:</u>
  - Water right: **Zero** (using existing city rights)
  - Seasonal storage: **Zero** (using Mother Nature's aquifer)
  - Infrastructure storage: **$2M** (per well)

ASR Permitting

- ASR is good water management policy
- Good supporting data (pilot test)
- Reservoir permit application is pending
- Facilitating ASR is an Ecology mandate:
  - Washington's Governor has endorsed ASR and has mandated it through the Columbia River Initiative
  - It is also being investigated in the Yakima River Basin Storage Study

So what's the problem?

Challenges to realizing ASR

- Why is there permitting uncertainty?
  - Timely processing, assurance for investments
- Water **quality**: streamline DOH/SWDA, WAC 173-200 (e.g., **DBPs**), WAC 173-157
- Recoverable **quantity**

Ecology needs to help make it happen.

In the least painful way.

ASR,
It Makes Too Much Sense

(for the City of Yakima)

- Saves money
- Increases reliability of supply
- Fills operational needs
- Is responsible water resource management

Thanks!

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