

Water Resources Planning for SW Oklahoma's Climate

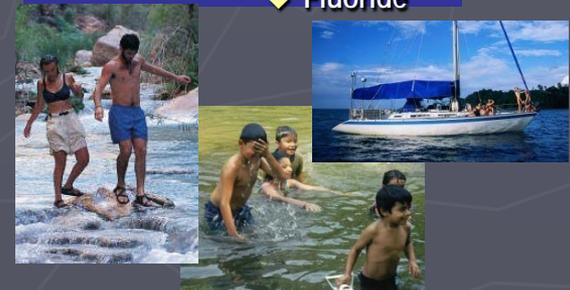
Planning and Management

Water And Wastewater

Why Must Our Approach to Planning Change

- ◆ We discovered new things in our water to be concerned about
- ◆ We all want to live, work and play in high quality environments
- ◆ We recognize that economic growth cannot flourish without sustainable plans for development (including water supply plans)
- ◆ Our assumption of low flow was based on wet years

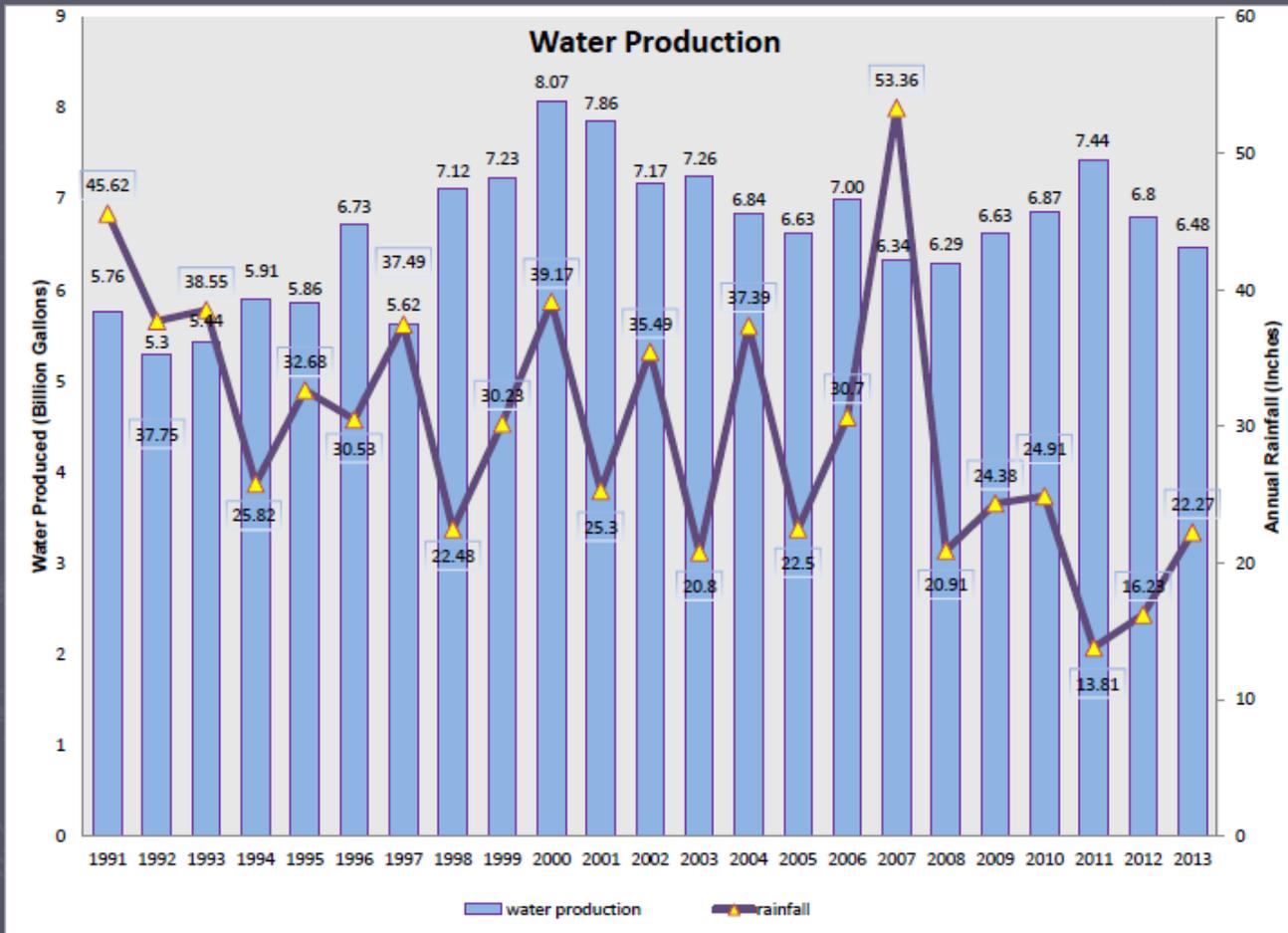
◆ THMs	◆ Nitrates
◆ HAAs	◆ Endocrine Disruptors
◆ Bromates	◆ Microbes
◆ Arsenic	◆ VOCs
◆ Nutrients	◆ TDS
	◆ Fluoride



Business

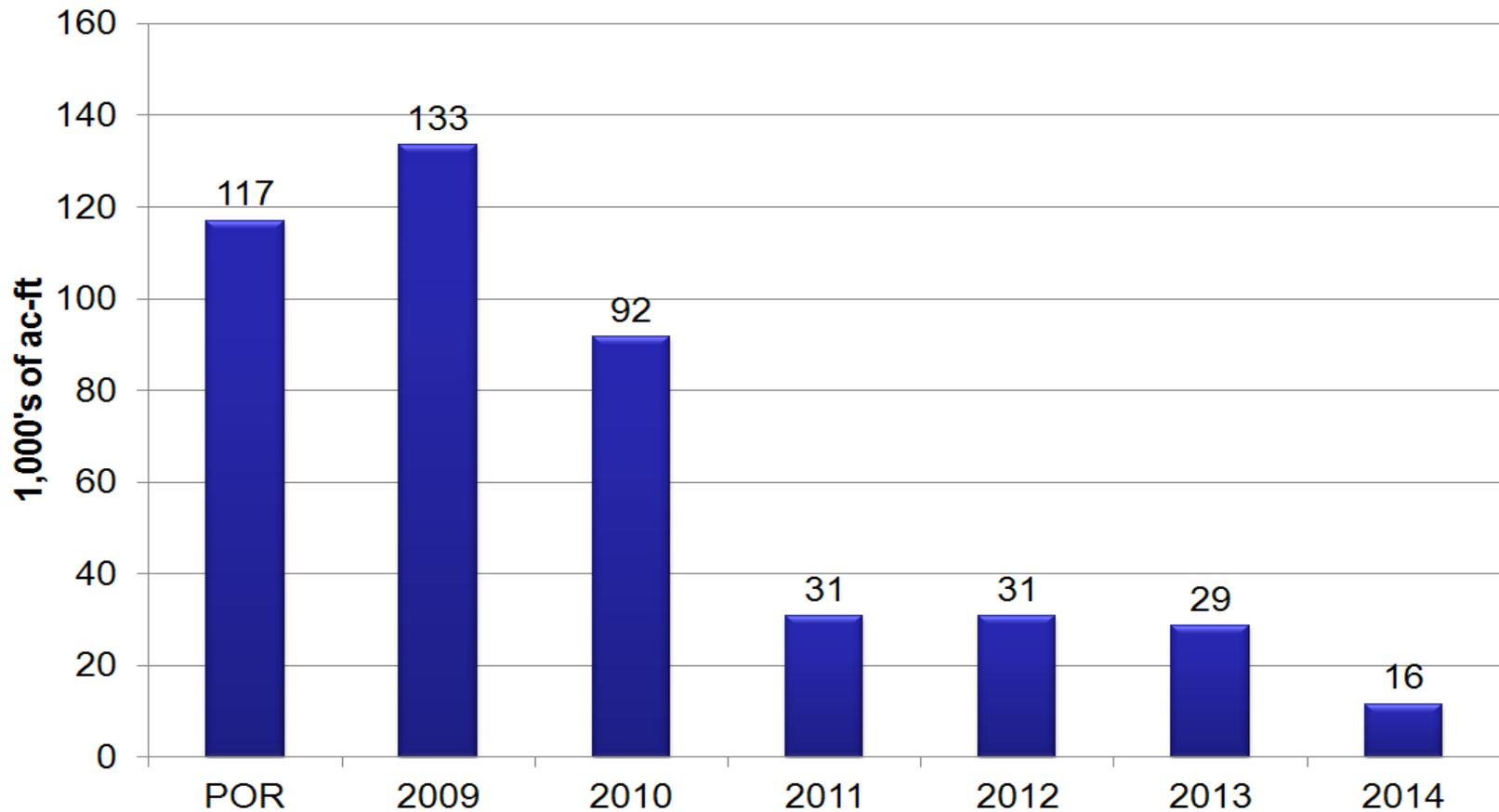
Environment

City of Lawton Water Consumption Trend

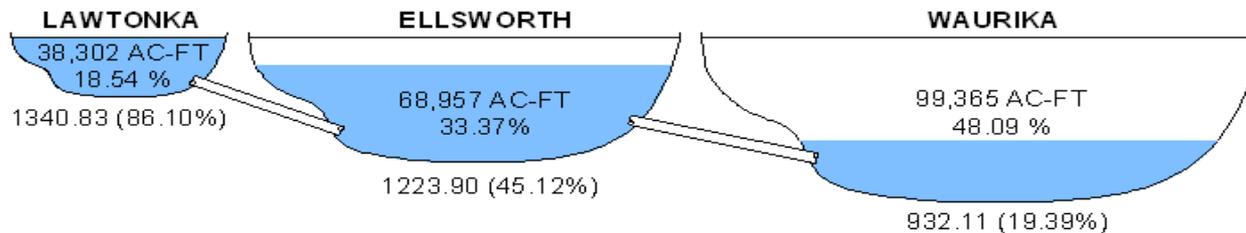


How Did We Get Here

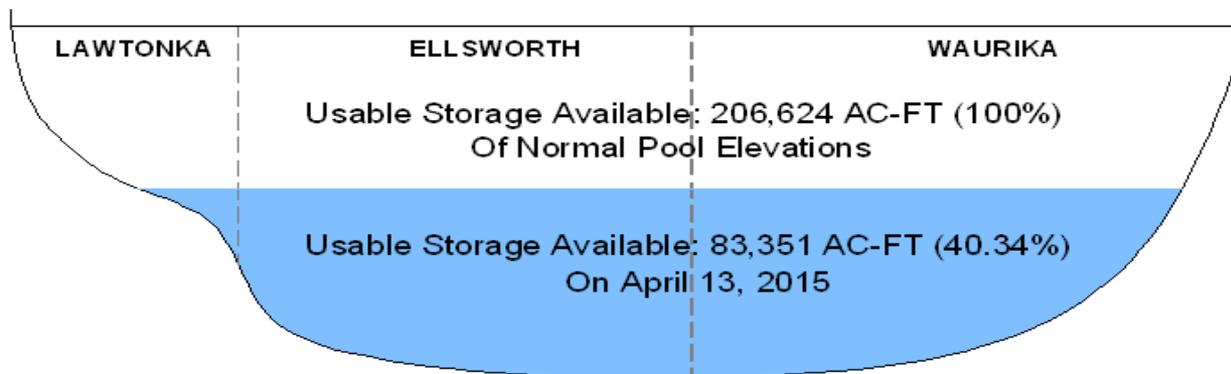
Waurika Lake Annual Inflow Totals



Water Conservation



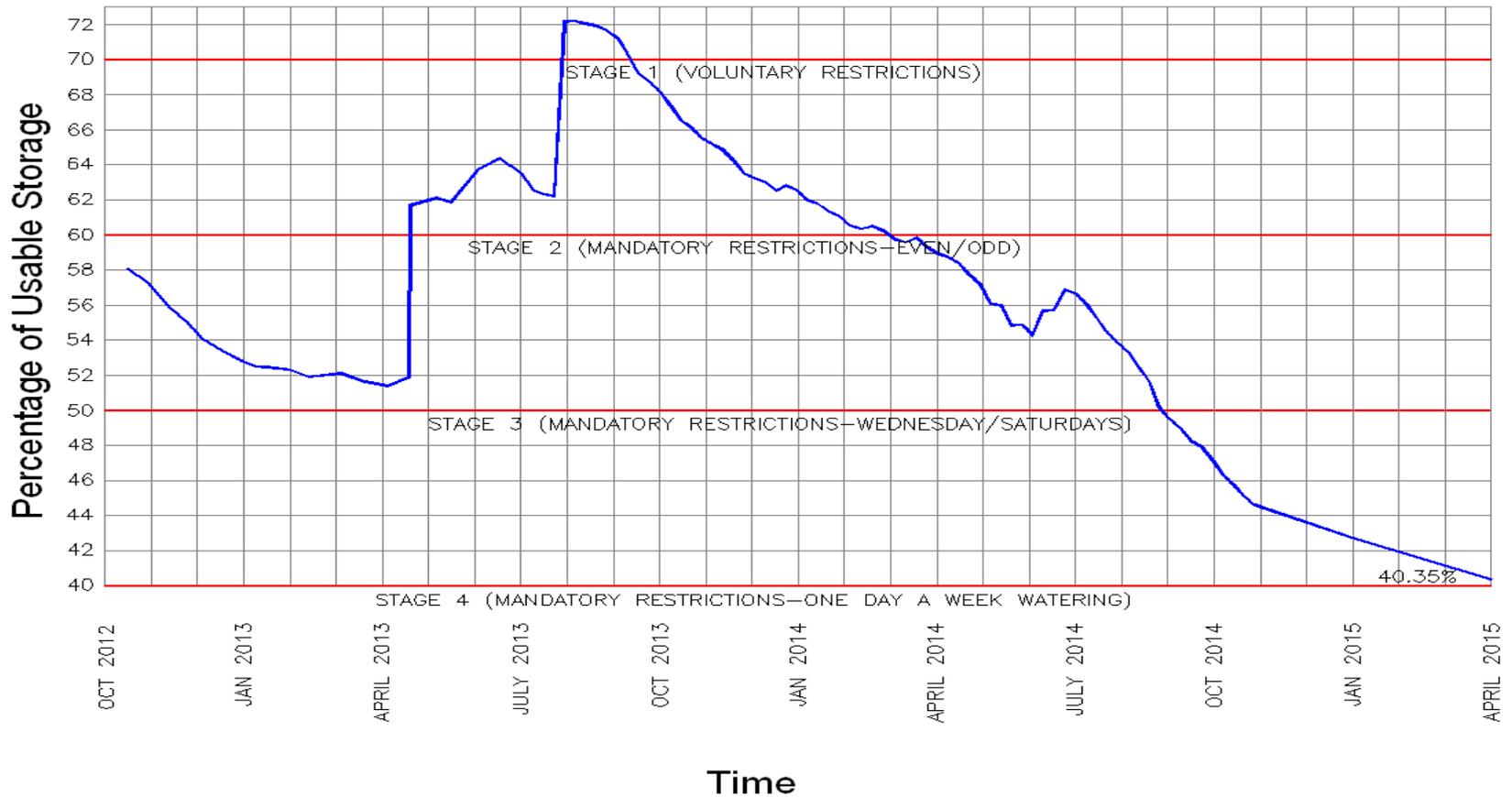
Conservation Based on Lawtonka, Ellsworth & Waurika



- STAGE 1-Voluntary Restriction (70%)
- STAGE 2-Mandatory Restriction (60%) Even/Odd
- STAGE 3-Mandatory Restriction (50%) Wednesdays/Saturdays
- STAGE 4-Mandatory Restriction (40%) One Day Per Week
- STAGE 5-Mandatory Restriction (30%) No Outside Watering

Available Storage

COMBINED WATER STORAGE DATA



City Of Lawton Integrated Approach to Alternative Water Supply

High-End Water Users

Industrial



180,000 gpd (2011)

GOODYEAR



900,000 gpd (2011)

REPUBLIC
Papercraft Company, LLC



1,500,000 gpd (2013)

Agricultural / Irrigation



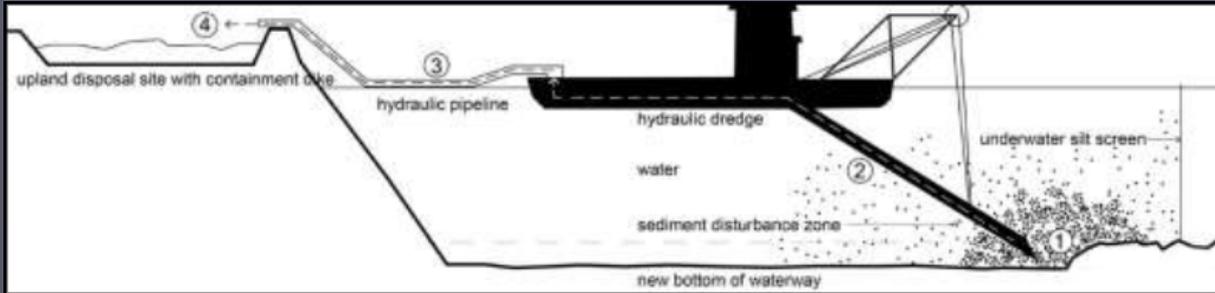
Reclaimed Water



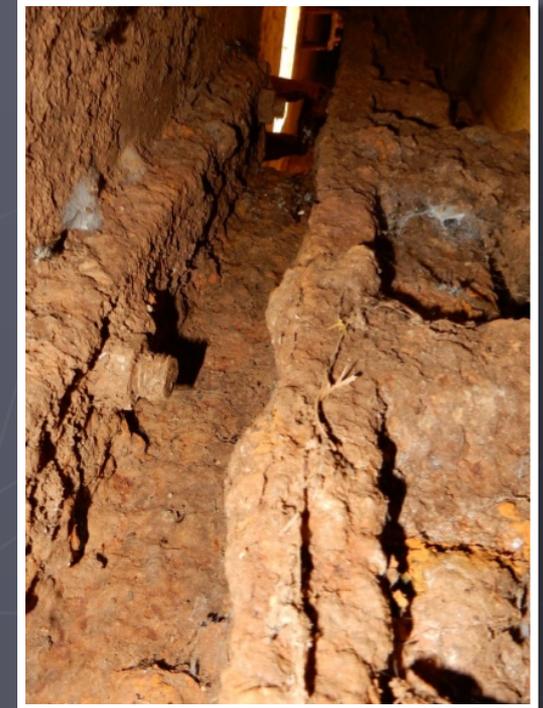
Up to 5,000,000 gpd

Waurika Intake Channel

Dredge Channel



Add Alternate Intake



Replace Old Gates

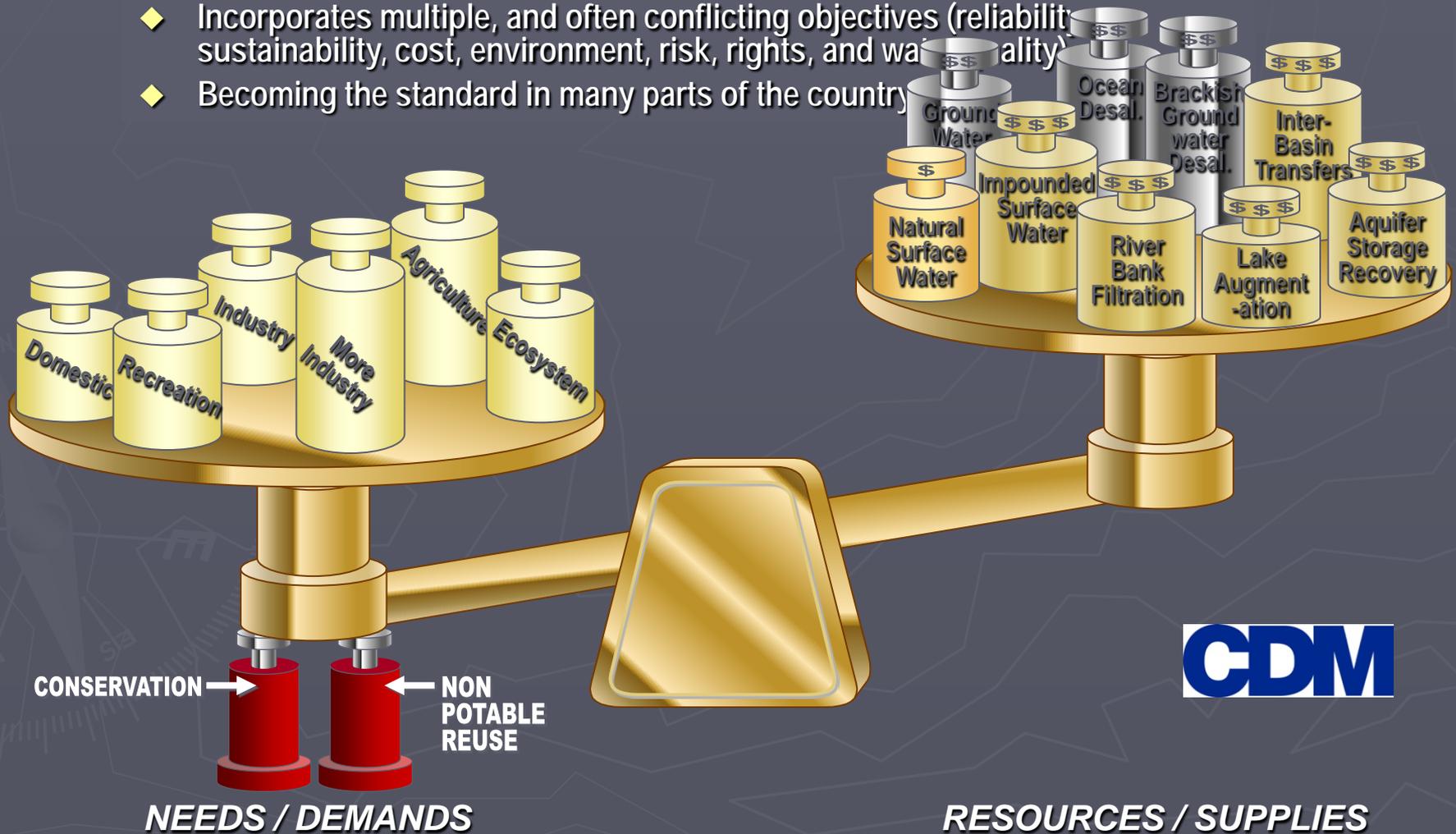
Cloud Seeding



Figure 11: Seedable cloud bases in Wichita Falls.

Integrated Water Resource Planning

- ◆ Evolved from power industry 20 years ago
- ◆ Evaluates both supply-side and demand-side options and considerably expands the solution portfolio
- ◆ Incorporates multiple, and often conflicting objectives (reliability, sustainability, cost, environment, risk, rights, and water quality)
- ◆ Becoming the standard in many parts of the country



Indirect Potable Reuse

Water Supply Alternatives – Indirect Potable Reuse



Lawton SEWTP



Lawton WWTP



Lake Ellsworth /
Waurika Lake



Direct Potable Reuse

Water Supply Alternatives – Direct Potable Reuse



River Bank Filtration

Water Supply Alternatives – Stream Water Supply

Lawton WWTP



Nine Mile/Cache Creek

Lawton SEWTP

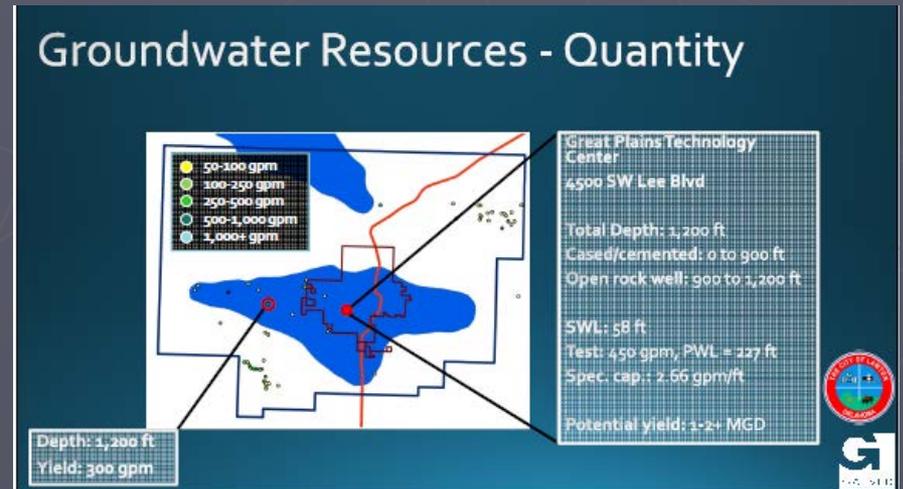


River Bank Filtration



Arbuckle Timbered Hill Aquifer Features

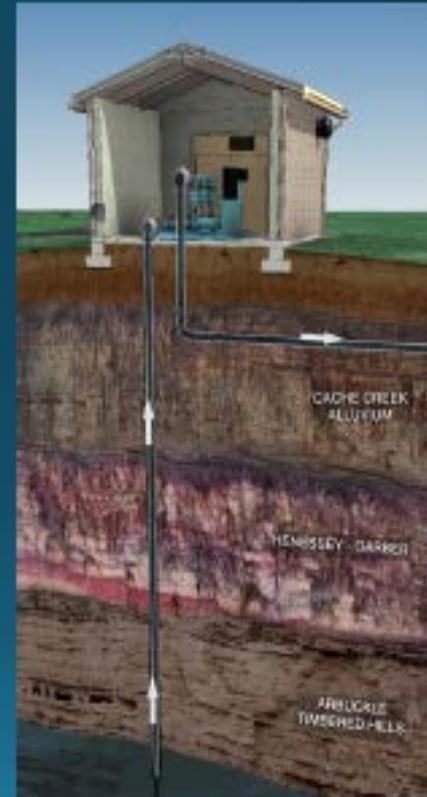
Very old formation
Marginally tapped
Karst topography
Limestone bedrock
Network of caves and
springs



Groundwater for Domestic & Non-Potable Use

Water Supply Alternatives

Groundwater Resources

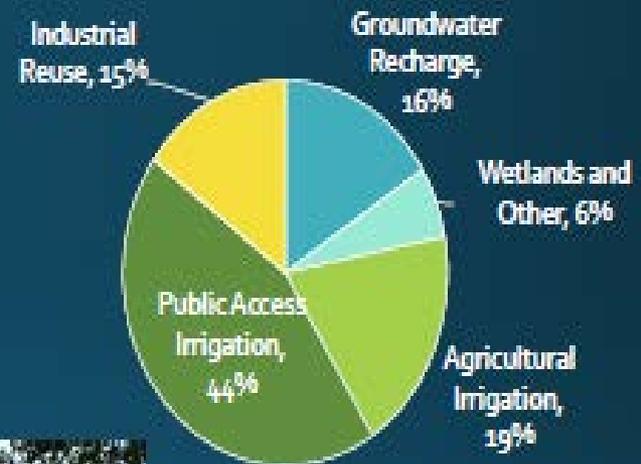


Non-Potable Use

Development of a Non-Potable Supply Implementation Plan

➤ Non-Potable Opportunities

- Irrigation
 - Public
 - Private
- Industrial/Commercial
- Institutional
- Municipal
 - Parks
 - Public facilities



Treatment

Groundwater Treatment

- Centralized Treatment



- Wellhead Treatment



Distribution

Determine Infrastructure by Service Area

➤ Treatment Criteria

- Location
- Quantity
- Quality

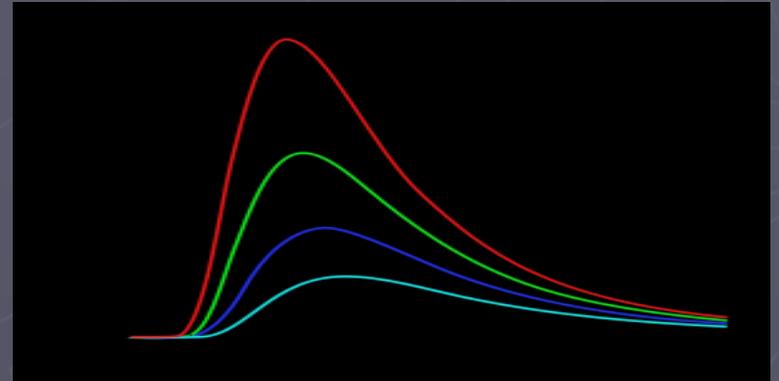
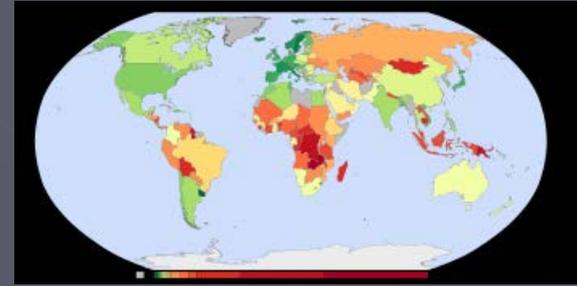
➤ Pumping

➤ Distribution



Questions

- ▶ Questions and answers
- ▶ Comments?



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