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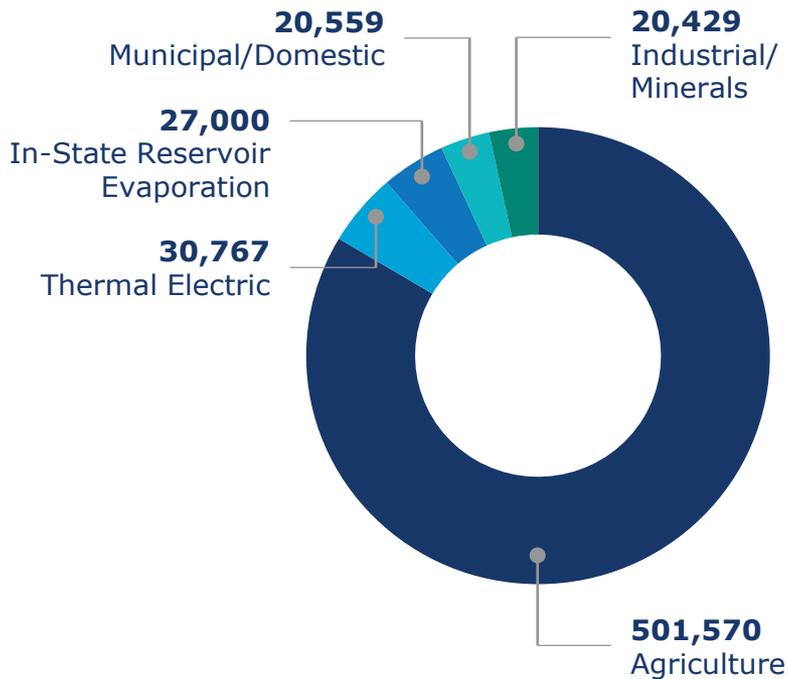
# **INDUSTRIAL WATER USE WYOMING'S COLORADO RIVER SYSTEM**

*Sept. 14, 2023*

# THE INDUSTRIAL SITUATION

## Wyoming's Colorado River System

### CONSUMPTIVE USE ACRE FEET/YEAR



■ Pre-Compact    ■ Post-Compact



### Post-Compact Examples:

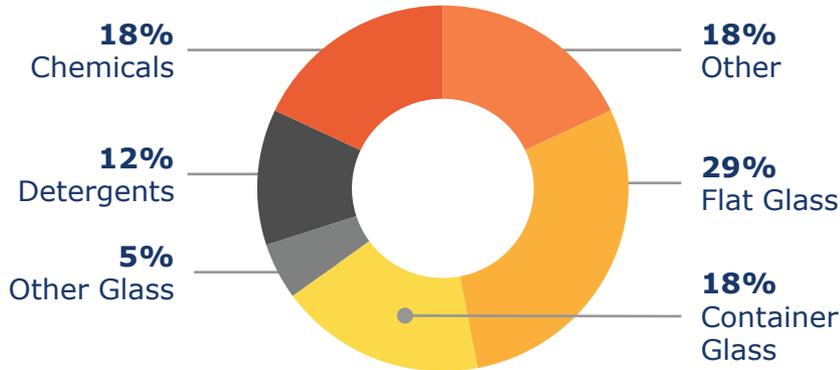
- Irrigation:
  - 2<sup>nd</sup> CFS
  - Free River
- Post Compact Storage
- Power Plants
- Trona Plants\*
- Cities and Towns

\*Trona plant's water rights 1946-1992 vintages.

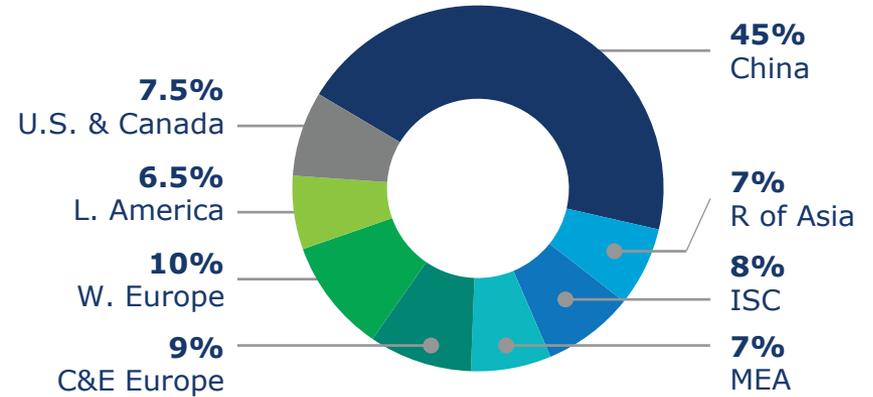
Source: Wyoming State Engineer's Office. 2011-2020 Estimates.

# SODA ASH MARKETS

## BY END USE



## BY GEOGRAPHY



**Wyoming Provides ~12 Million Tons of Natural Soda Ash Annually—  
2X Domestic demand or ~20% of the Rest of the World's Soda Ash Needs**

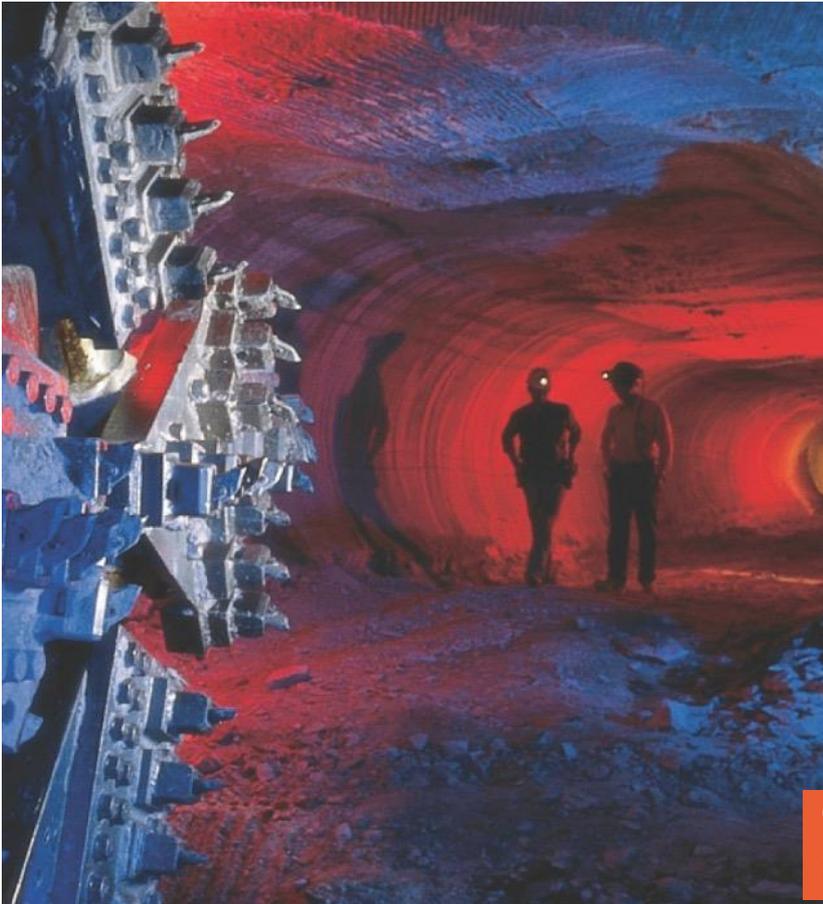
It is a certainty that trona-related products from Wyoming touch your life every single day.



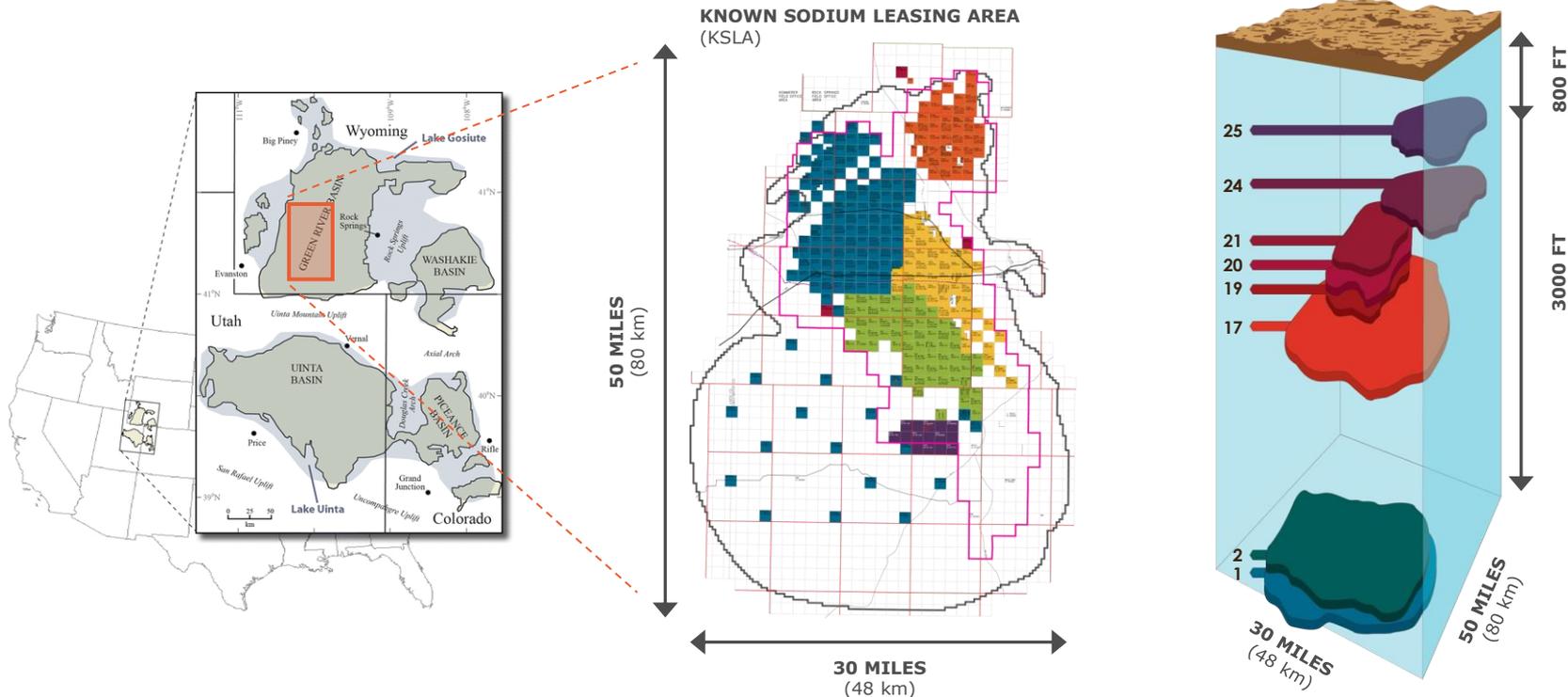
\*Other includes mining, oil & gas, flue gas desulfurization, etc.; Source: IHS, 2021.

# NATURAL SODA ASH PRODUCTION

## Green River Basin



# GREEN RIVER TRONA A TRULY UNIQUE RESOURCE



**~100 billion tons of resource.**  
**(USGS Estimate)**  
**1000s of years of reserves**

**Accounts for over 90% of the world's economically mineable trona ore**

**\$2B Net Revenue**  
**>2300 Direct Employees**  
**~\$400M Direct Wages & Benefits**  
**~\$80M Taxes & Royalties**

# CURRENT CURTAILMENT MITIGATION TOOLS

## The First Step



### Conservation Efforts:

Zero discharge  
Water recycle/reuse  
~15% reduction in intensity

## Temporary w/Long Term Options



### Temporary Water Use Agreements:

Wyoming Statutes 41-3-110 to 41-3-112

### Exchange:

Wyoming Statutes 41-3-106

## Duration?



### Storage:

Wyoming Statutes 41-3-302, 41-3-303,  
41-3-305

## Permanent



### Permanent Transfers:

Change in place of use.  
Wyoming Statutes 41-3-104

\*Common Theme: No injury to other rights.

# KEY CHALLENGES

## Back-up Water for Curtailment Mitigation

1

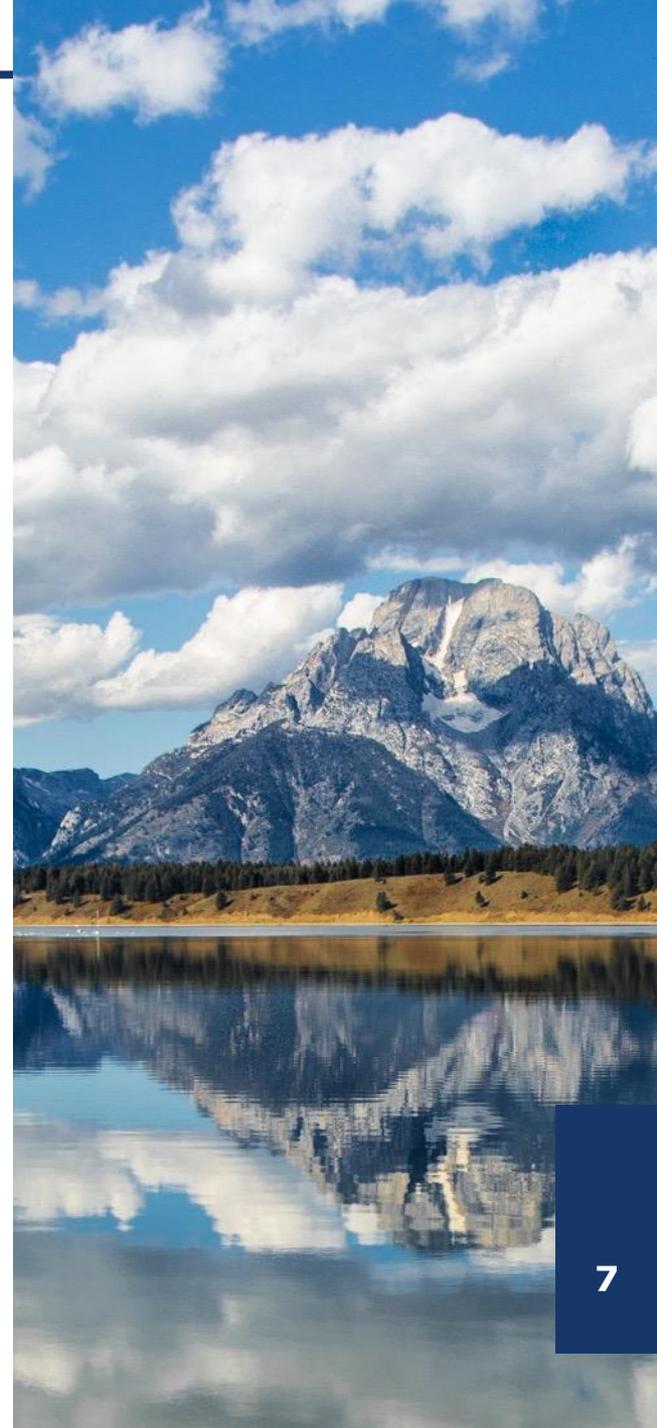
**Potential mechanisms for longer term water transfers have not been widely used for this purpose and have UNCERTAINTIES**

- **Temporary Water Use Agreements**
  - Wyo Statutes 41-3-110 - 112
- **Exchange**
  - Wyo Statutes 41-3-106
- **Permanent Transfers (Change type or place of use)**
  - Wyo Statutes 41-3-104

2

**Western Wyoming water market is inefficient, leading to low participation**

- Lack of clarity hinders participation in water transfer contracts
- Mechanisms do not currently capitalize on “low hanging fruit” opportunities.



# OPPORTUNITIES

## Create clarity where possible.

- Continued Education
  - Details of the water transfer processes
  - Unknowns / consequence
  - Consumptive use vs diversion
- Pilot projects to create understanding **AND** confidence
  - Water transfer mechanisms
  - Consider a water banking specific set of rules/statutes

Based on learnings from Pilot Projects, tweak statutes/regulations only if necessary

Find Partial Year Fallow approaches that save real water and then make them **ACCEPTABLE** as options for conserving consumptive use

Work on appropriate ways for Ag and other users to be rewarded for lasting efficiency type improvements that currently have limited gain for the implementer.

- Creates market-based mechanism encouraging efficiency improvements
- Ditch/canal losses
- Non-field savings
- Is there a way to translate these **REAL** savings into transferrable water for junior users without implicating 'Beneficial Consumptive Use' provisions of the Colorado River Compact

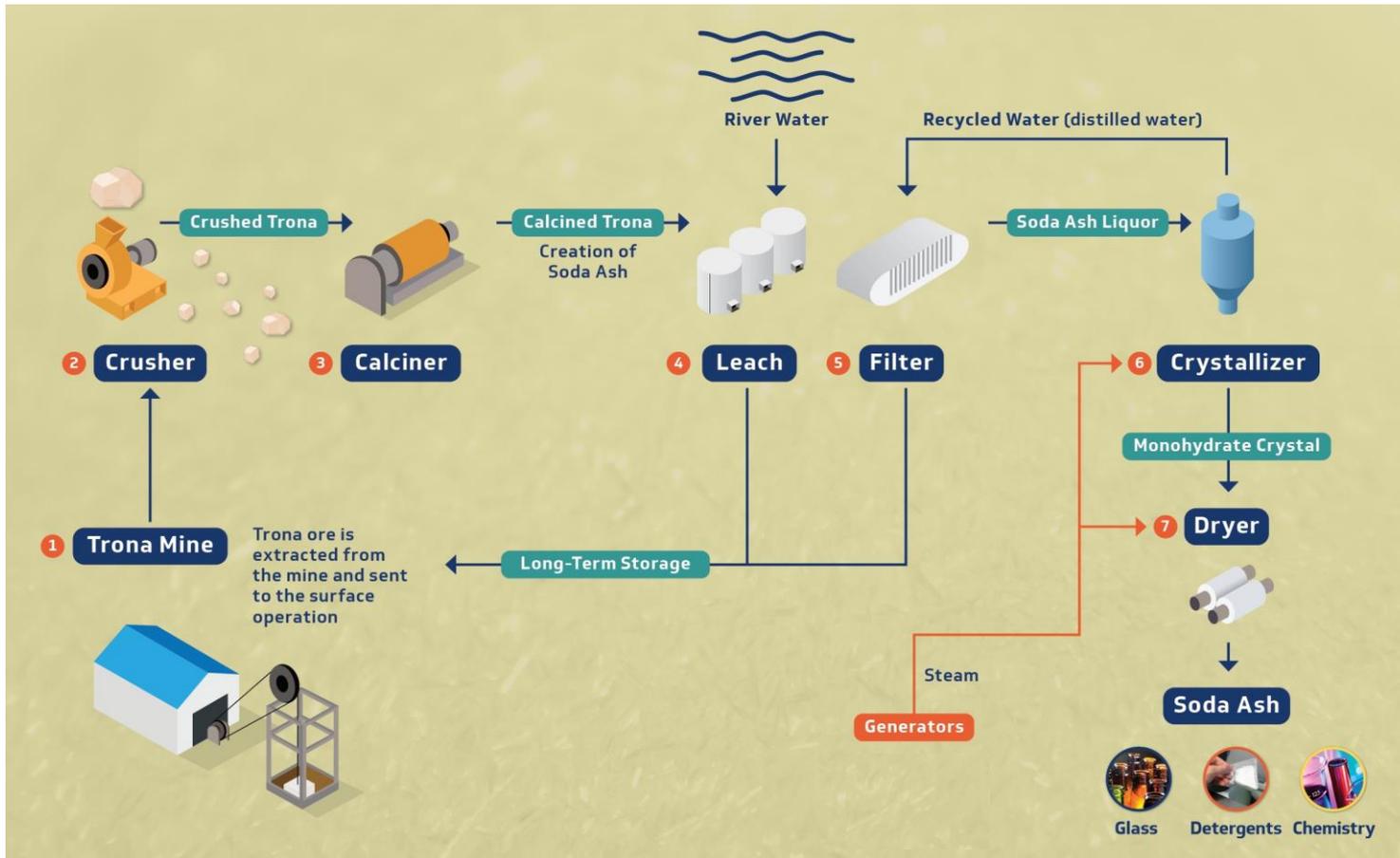
# QUESTIONS?



# ADDITIONAL INFORMATION

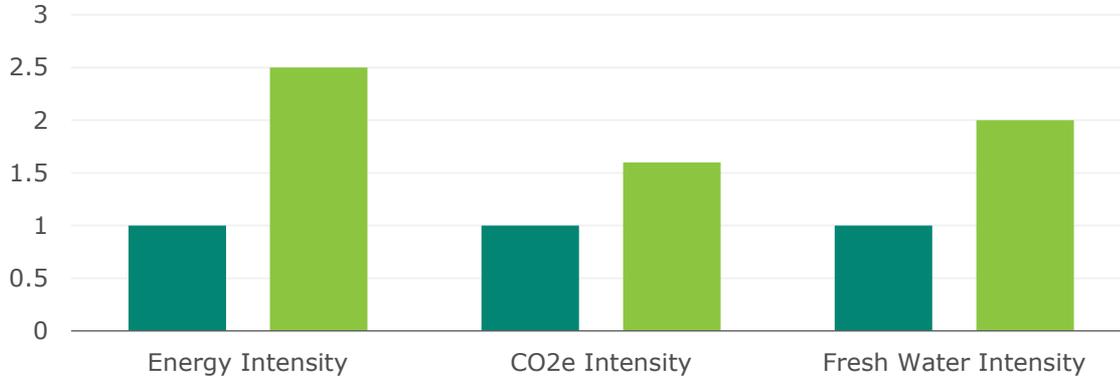


# NATURAL SODA ASH PRODUCTION PROCESS



# US NATURAL SODA ASH ASH PRODUCTION

## The Right Choice



■ US Natural Soda Ash  
 ■ Chinese Synthetic Soda Ash

**Sources:** Energy Data from May 2015 Life Cycle Assessment on US Soda Ash Chinese Life Cycle Database, Sichuan University, China 2009-2011.

Water from internal estimates (US Natural) and 2007 European BREF.

Production Costs from internal estimate.

**Water Is Recycled >12 Times**

### WYOMING NATURAL SODA ASH INDUSTRY

Total Tax Value  
 (excluding income taxes)  
**\$79,424,996**

Total Payroll & Tax Value  
**\$452,340,051**



- Direct Payroll & Benefits (\$371,915,055)
- Ad Valorem Tax on Production (\$26,699,823)
- Severance Tax (\$18,343,313)
- Federal Mineral Royalties (\$15,045,336)
- Ad Valorem Tax on Propertaty (\$8,269,035)
- Sales Tax (\$7,969,105)
- State Royalties (\$3,098,384)

**Over 2300 Direct Employees and 470 Contract Employees**

# INEFFICIENT MARKET

## Low Participation



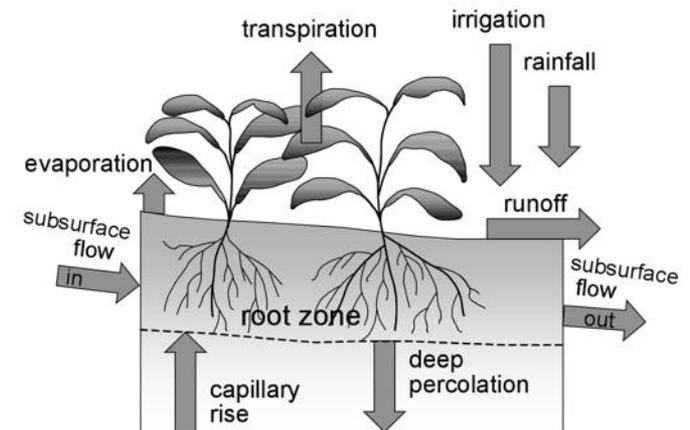
### EXAMPLE 1

How much water do I have to transfer:

Curtailment and water transfers are based on conserved **consumptive use**. Wyoming(Ag) normally operates based on **diversions**.



Soil water balance of the root zone



# OTHER KEY UNKNOWNNS

## WATER TRANSFERS

- 1 | When will a curtailment occur?
- 2 | How long will curtailment last?
- 3 | When will curtailment be announced in given year?
- 4 | What if irrigation has already been turned on when curtailment is announced—how will it impact the transferrable water?
- 5 | How far back on the priority list will curtailment go?
- 6 | Will the senior water rights holder (Ag) have enough water to fulfill their needs if they are held to just their pre-compact rights?
- 7 | Inflation?
- 8 | Abandonment if the transfer goes 5 years?
- 9 | What if some of may land sub-irrigates?
- 10 | What if my system is regulated some years?
- 11 | What if my headgates wash out due to floods?
- 12 | What will my neighbors say/think/do?
- 13 | Knowledgeable lawyers available?
- 14 | Is someone else going to get rich from my water?

# LOW HANGING FRUIT

## Not Adequately Utilized



### Full year fallow viewed as the 'standard' for System Conservation Pilot Program (SCPP) and Water Transfers.

- Real concern exists over the risk and impact with multiple year full fallow, or even just a single year full fallow.
- Partial year potentially more palatable for a much larger group, even if the conserved/transferrable water amount is considerably less per acre.
- Is there a partial year fallow option that can create real conserved consumptive use that could be part of a water transfer to junior water rights holders in curtailment?

### Improved practices do not often result in additional transferrable water for the implementer.

- SCPP calculation recognized only 'on-field' conserved consumptive use, not the system savings from reduced conveyance/ditch loss or savings from reduced 'non-beneficial' consumptive use.
- Reductions in inefficient water use do no result in additional transferrable but could even potentially result in less transferrable water (lower baseline consumptive use)