

DEVELOPMENT OF A GIS BASED TOOL TO OPTIMIZE PRODUCED WATER TREATMENT

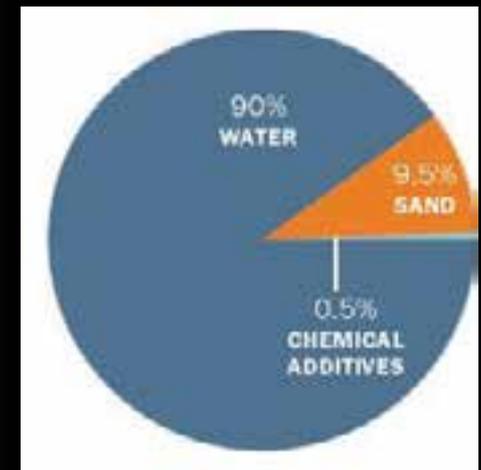
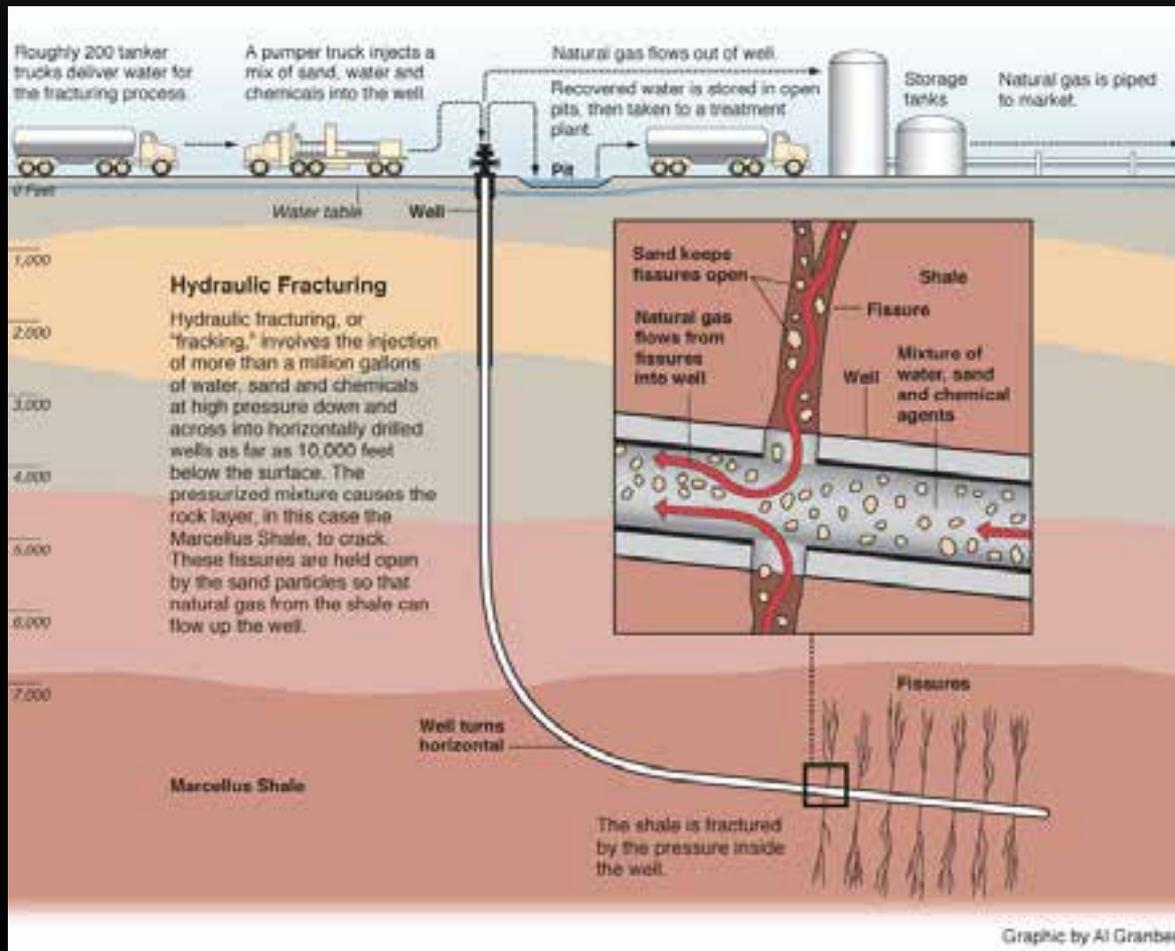
Ashwin Dhanasekar, Dr. Ken Carlson
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INTRODUCTION

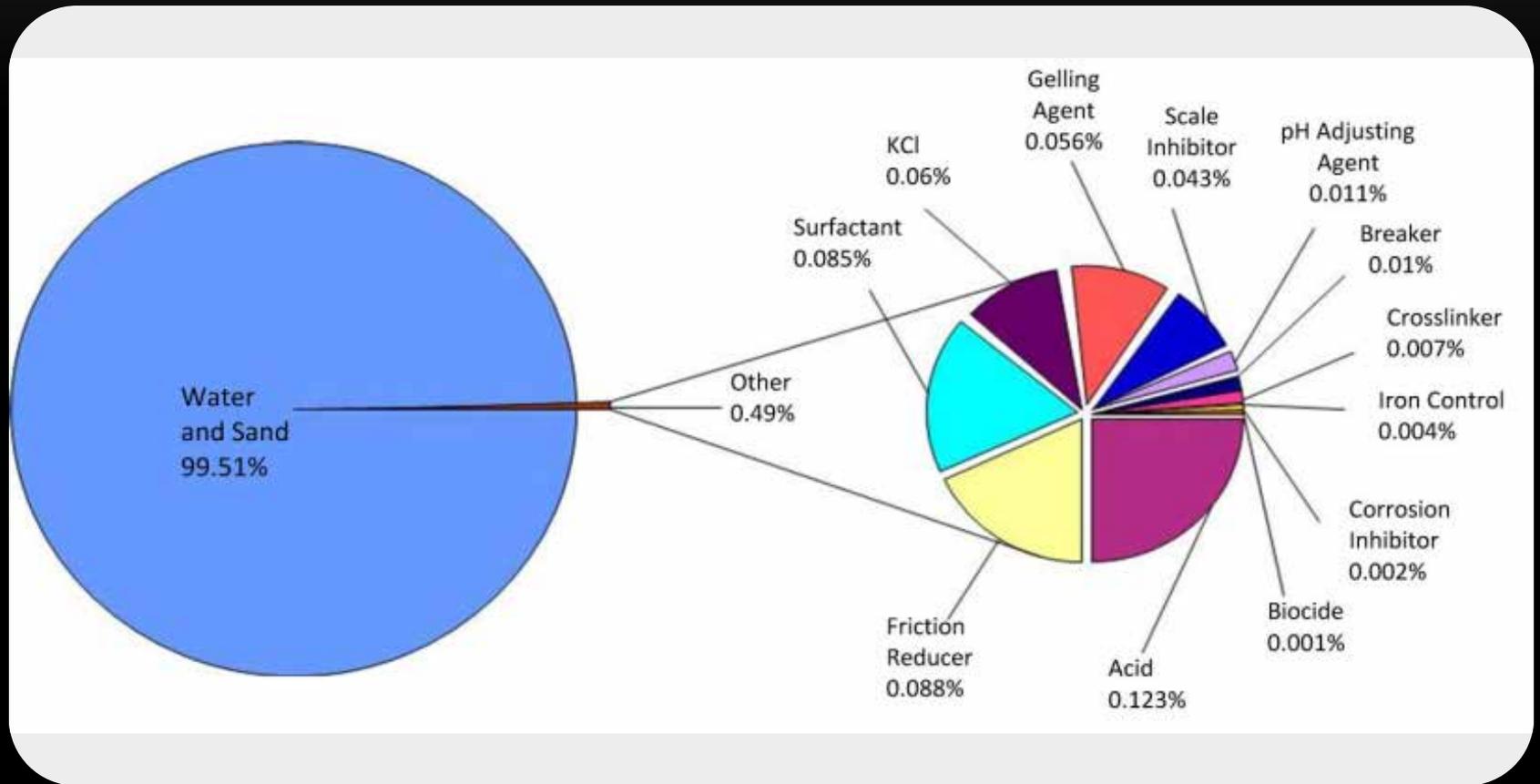
- Hydraulic Fracturing
- Produced Water
- Current Scenario
- Colorado Energy Water Consortium
- GIS Tool
- Chemistry Tool
- GIS Based Treatment Application



HYDRAULIC FRACTURING



WATER USED FOR DRILLING



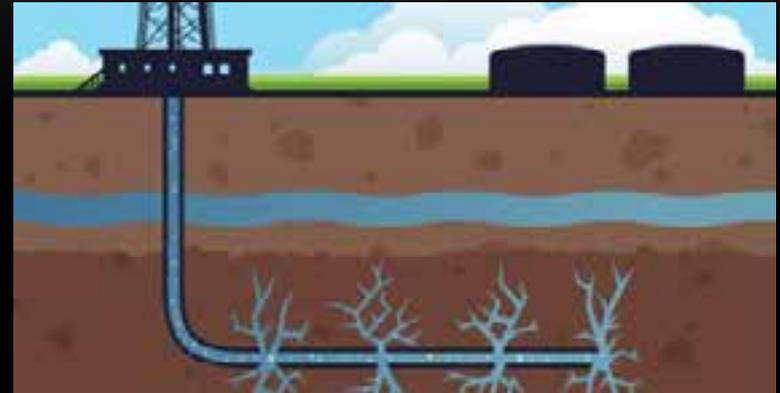
0.088%
Friction
Reducer

0.123%
Acid

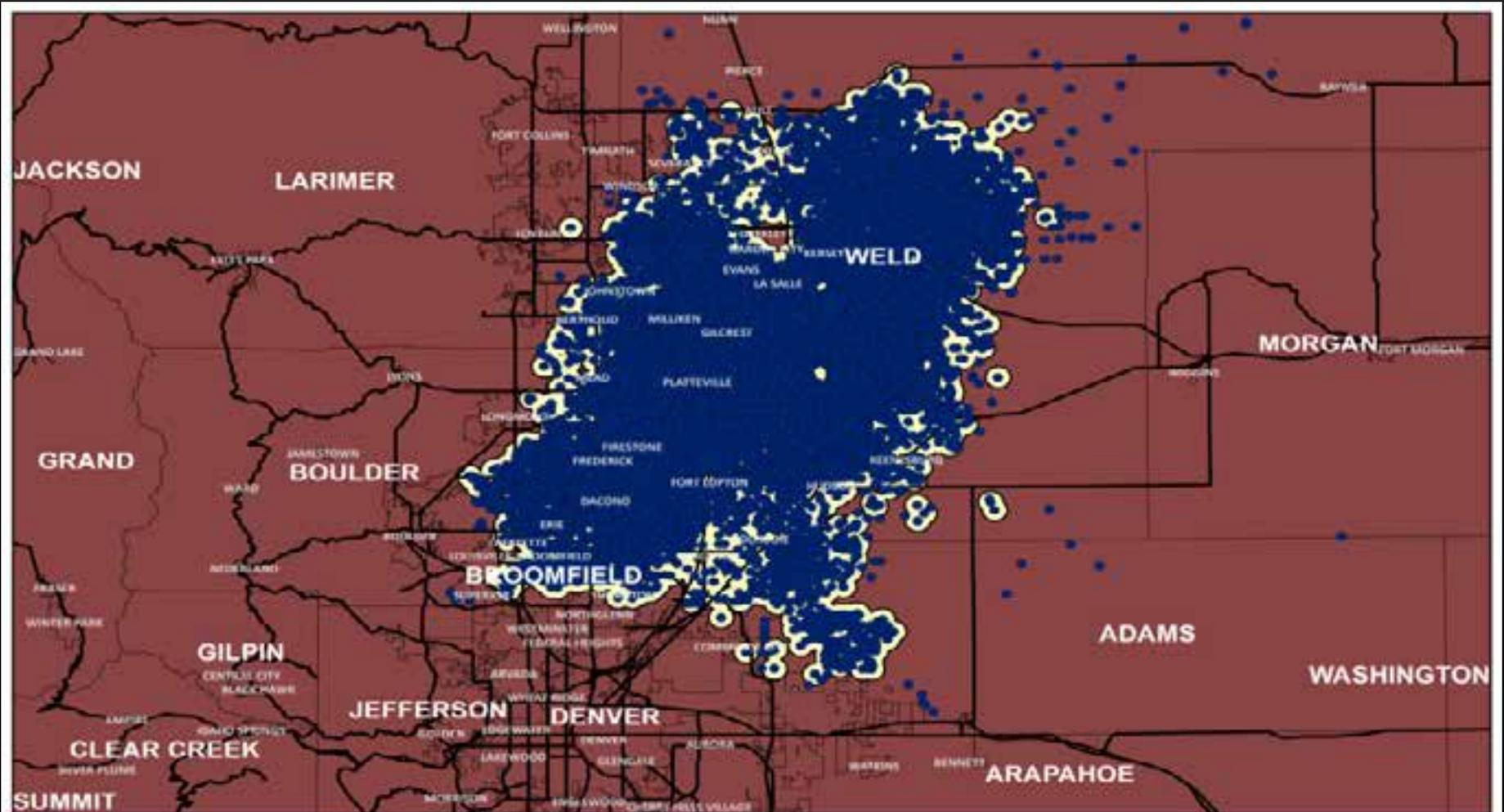
0.001%
Biocide

PRODUCED WATER

- Recoil of the Drilling Process
- Frac Flowback
- Produced Water
- Current Scenario



AREA OF CONCENTRATION

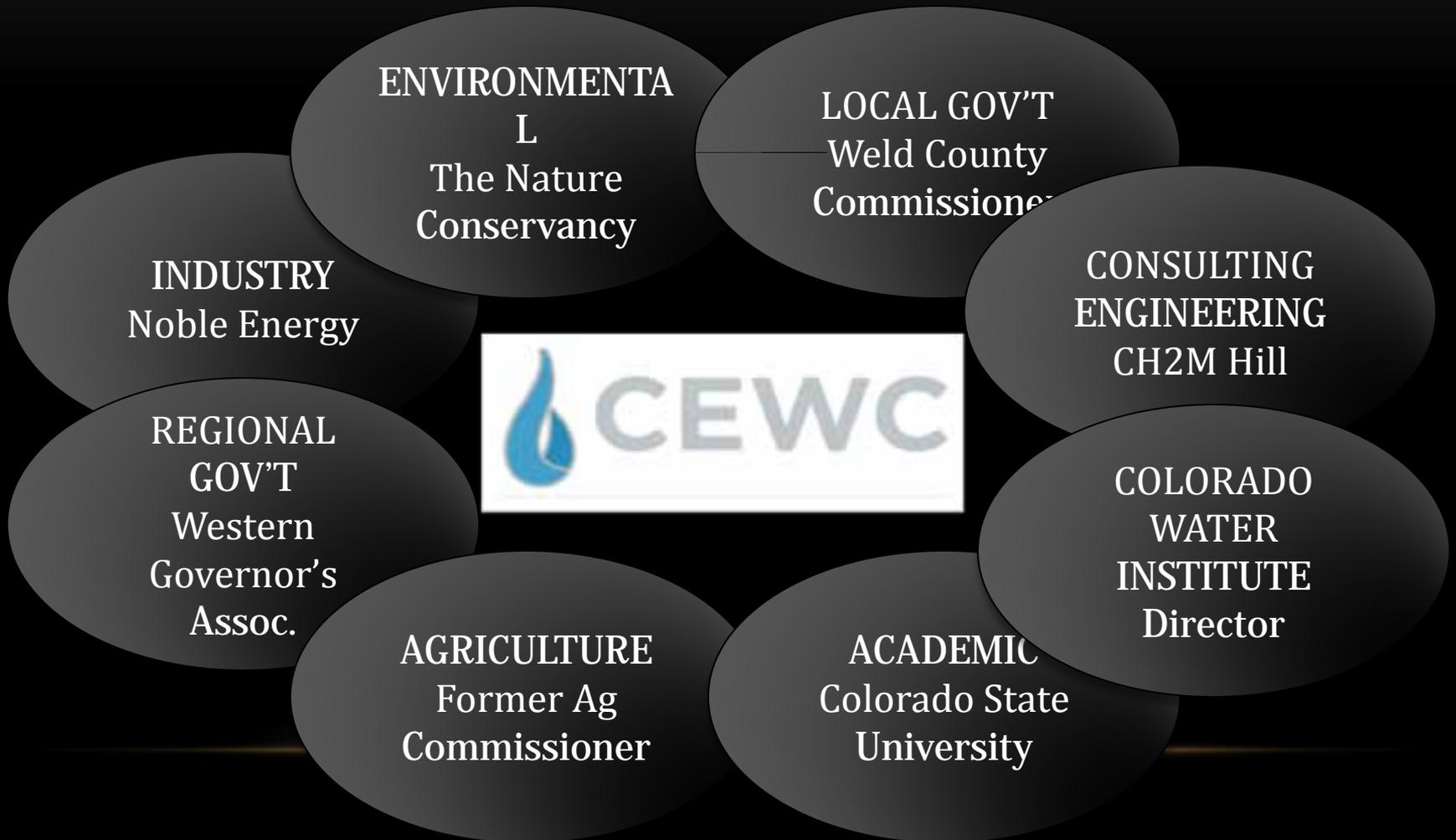


Legend

- Oil & Gas Wells
- Highways
- Wattenberg Field

Data Source: COGCC Database, Colorado State University

COLORADO ENERGY WATER CONSORTIUM



DATA COLLECTION

Public Data

- State Databases
- Public Websites

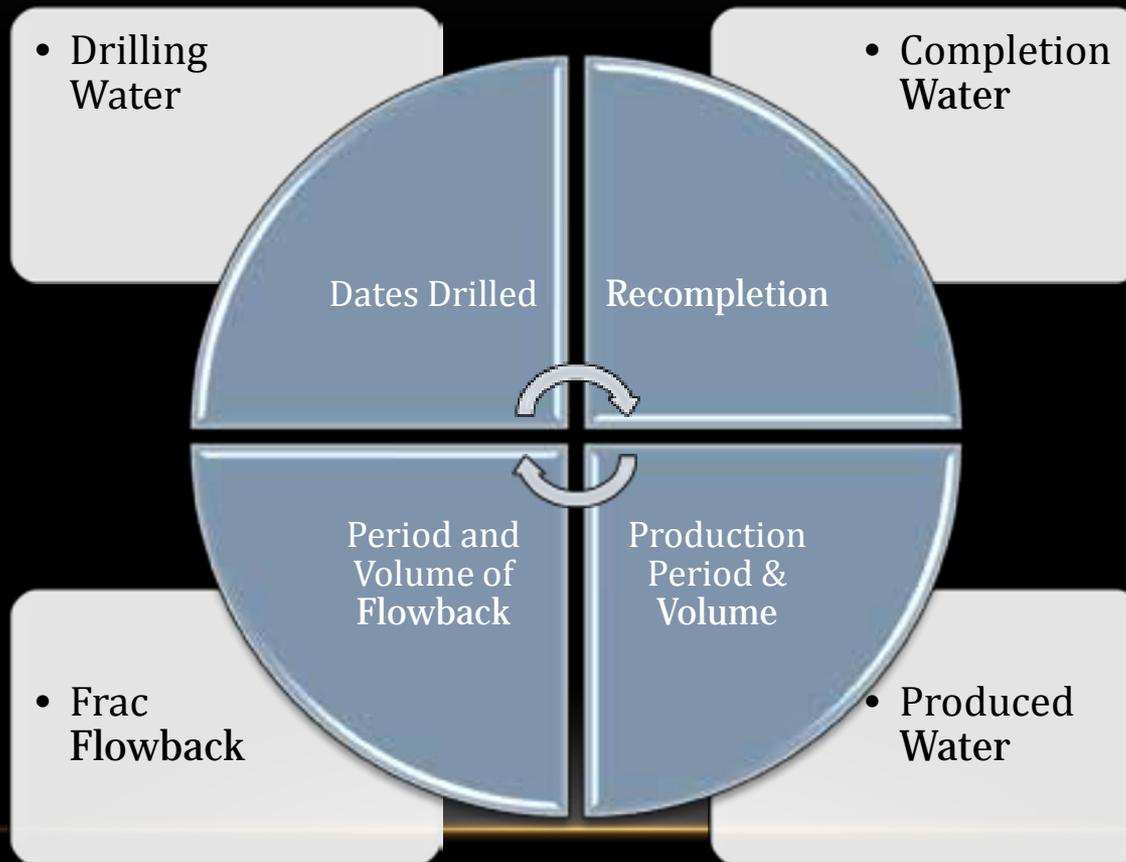
Private Data

- Industry – Noble Energy
- Other Industries

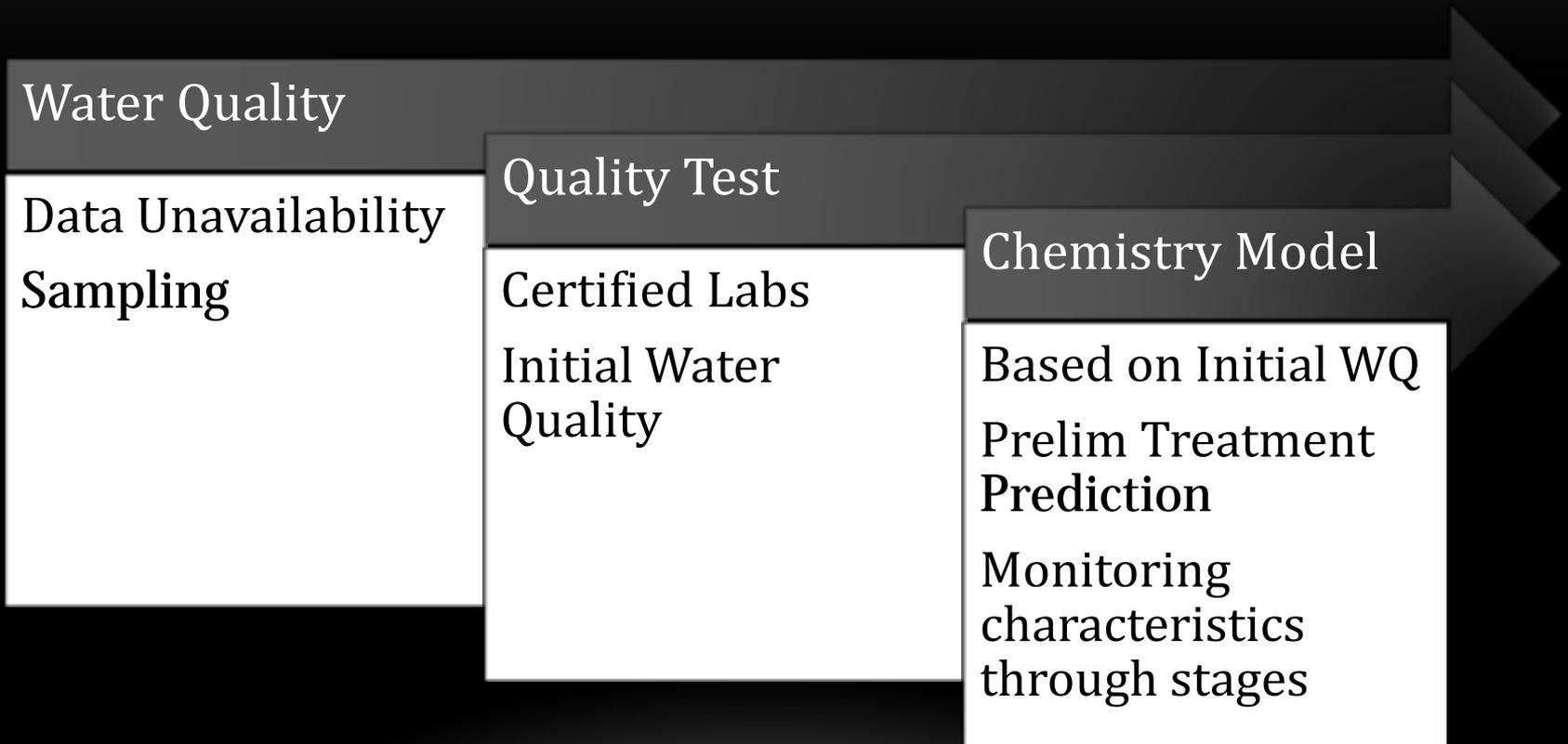
Common Data

- Government Agencies
- Colorado Oil & Gas Association

QUANTITY ANALYSIS & PREDICTION



QUALITY ANALYSIS & TREATMENT MODEL



PRIMARY GIS MODEL – QUANTITY BASED

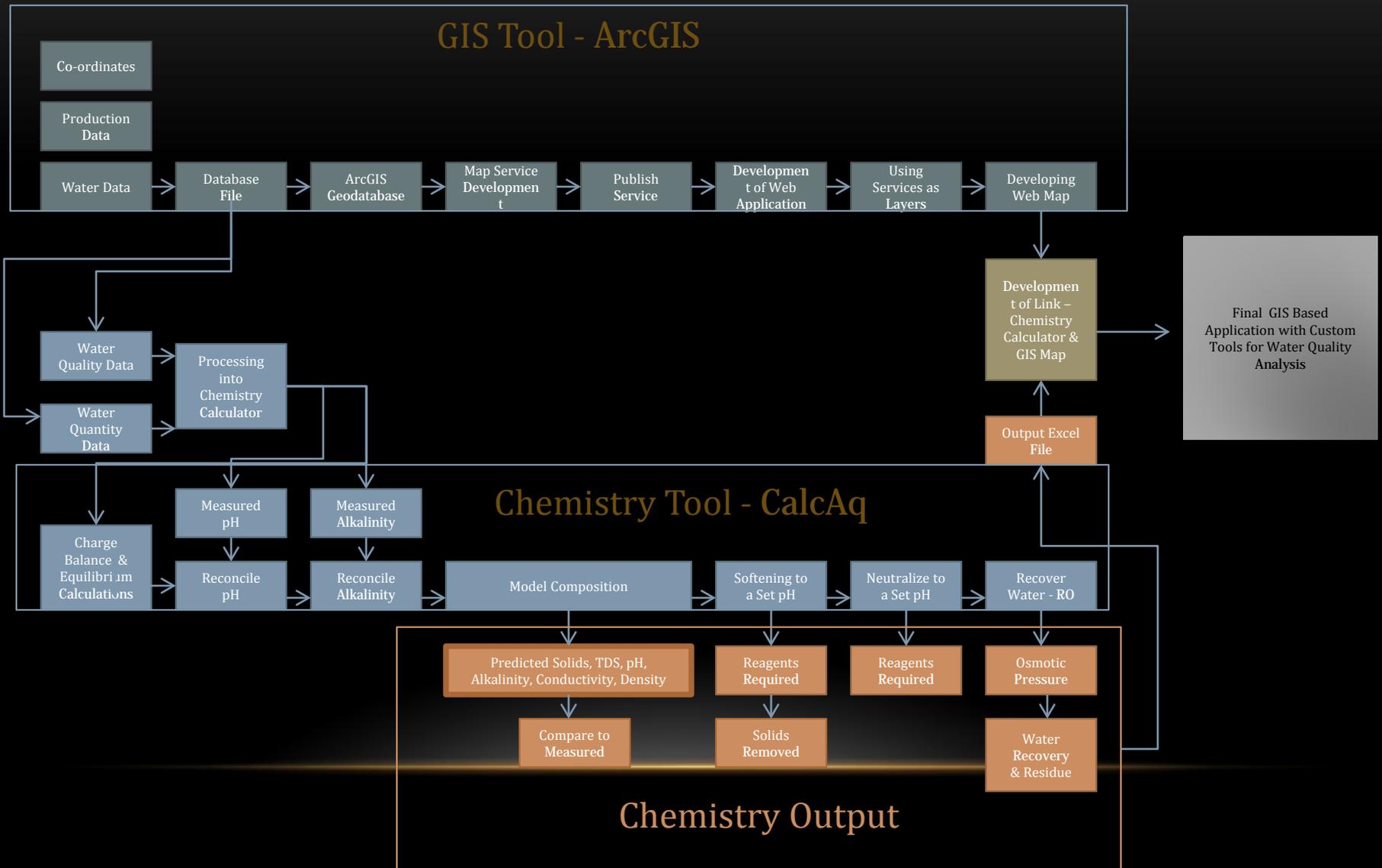
Data Collection & Analysis

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graph TD; A[Data Collection & Analysis] --> B[Prediction Scenarios Developing & Processing]; B --> C[Publishing on ArcGIS Explorer Online for Public Viewing];
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Prediction Scenarios Developing & Processing

Publishing on ArcGIS Explorer Online for
Public Viewing

INTEGRATION OF CHEMISTRY MODEL & GIS TOOL



Spatial Optimizations



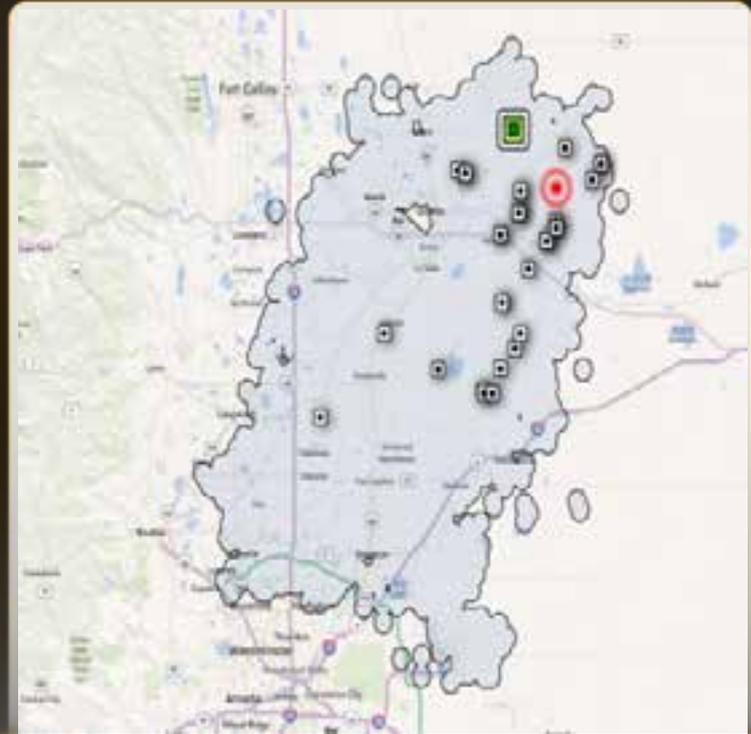
Centralized
Treatment Facility



Optimized Truck
Routing



Optimized Truck
Pick-ups



ADVANTAGES

Spatial Analysis

Area Specific Predictions of
Production & Treatment

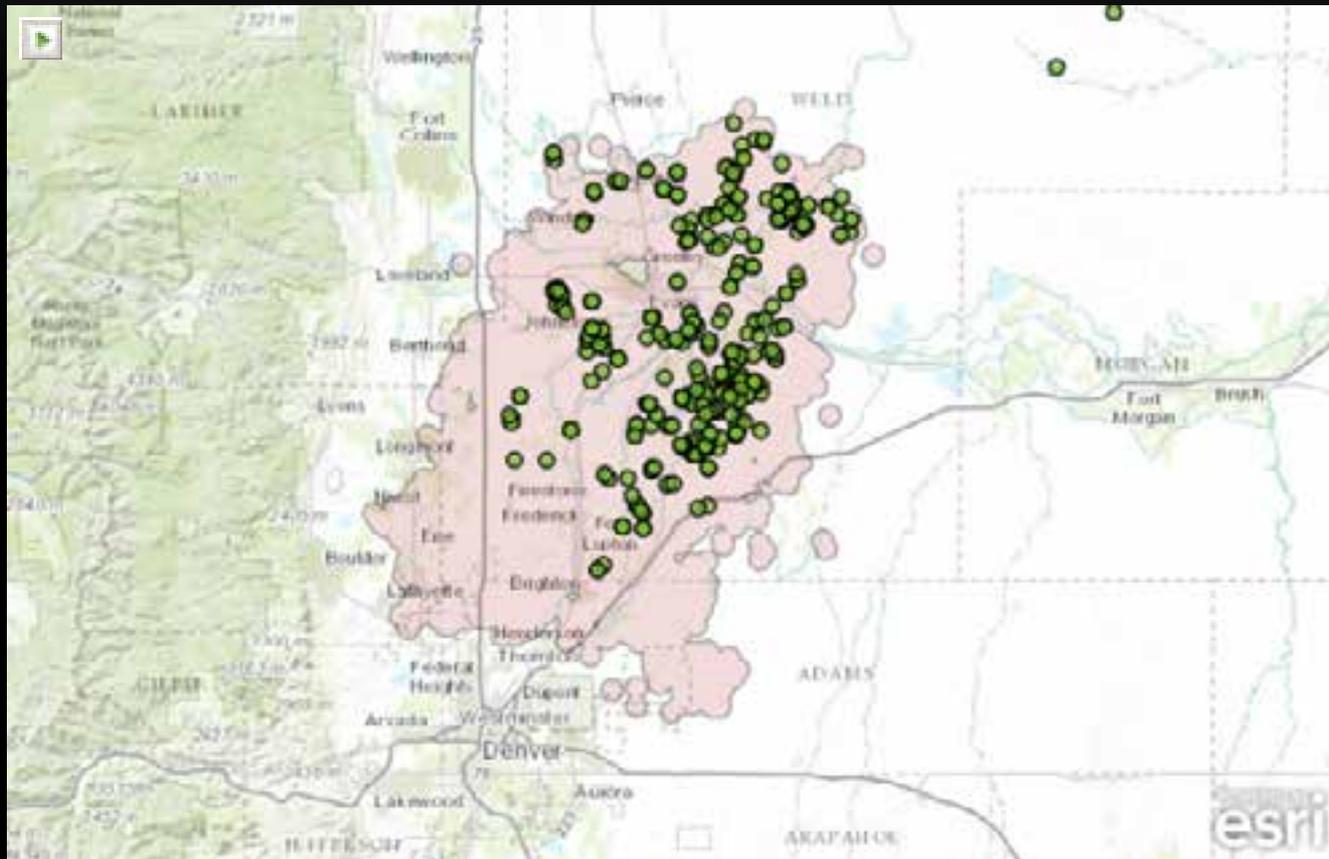
Optimized
Analytics

Optimized Routing &
Reduced Truck
Traffic

Optimized Location
of Treatment Facility

Public Awareness

DEMONSTRATION MAP



ACKNOWLEDGEMENTS

- Department of Civil & Environmental Engineering, Colorado State University
- Dr Ken Carlson (kcarlson@engr.colostate.edu) Associate Professor, CSU
- Noble Energy Incorporation – Mr. Caleb Douglas & Dr Ken Knox
- Dr. James Hardy, ChemCorr LLC (OLI Systems, CalcAq)
- ESRI Regional Office & The Southwest User Group, Broomfield, CO

More information:

<http://cewc.colostate.edu/>

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QUESTIONS

HARDQUESTIONS

