



Water Management: Linking E&Ps to Service Companies



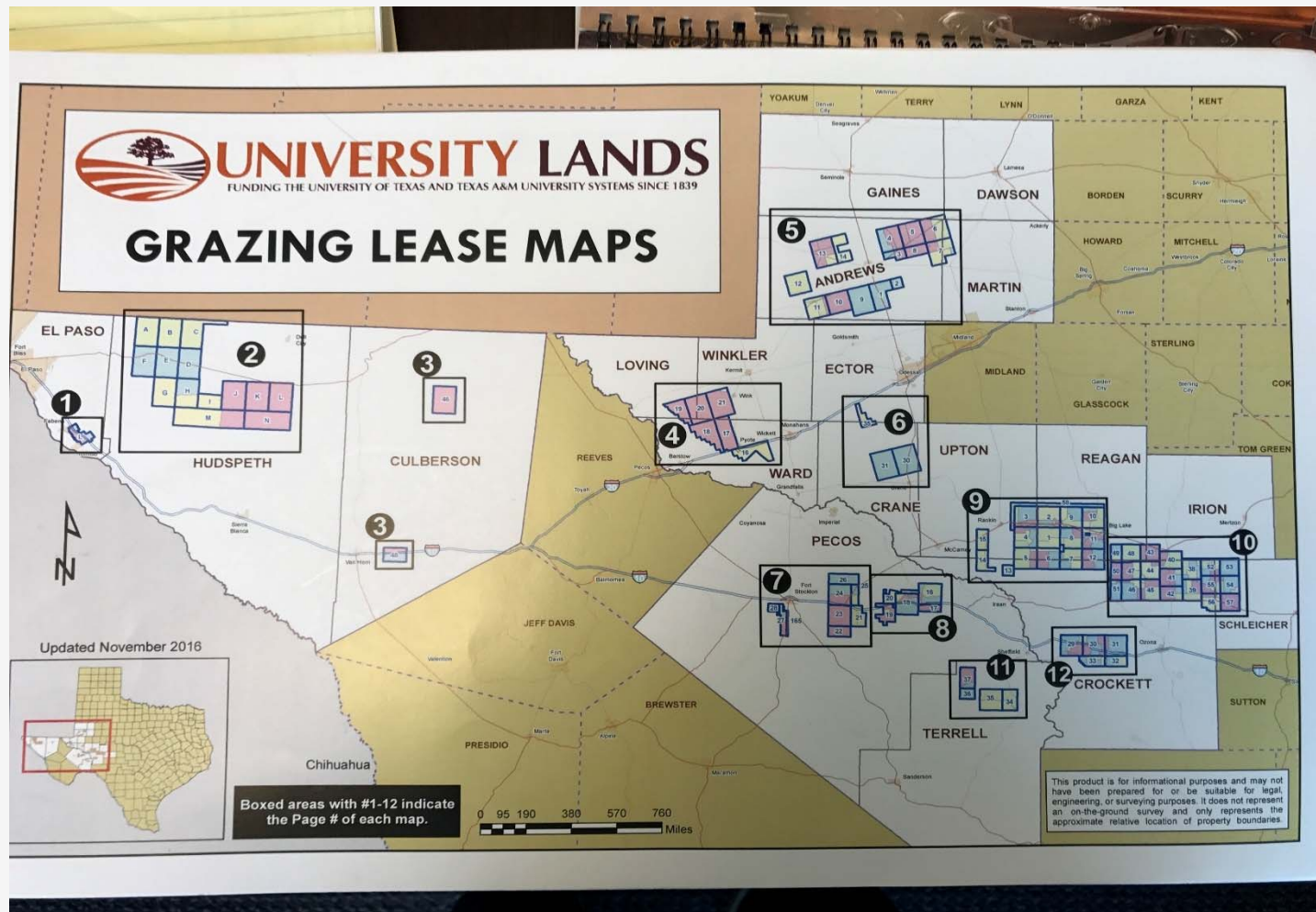
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Water Management: What Do We Need??

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Water Management: What Do We Need??

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- ❑ Start with a 30,000' Perspective “DREAM”
- ❑ “WE” is the E&P Companies
- ❑ **Full-Cycle Water Management: Not Just:**
Pipelines, SWDs, Bacteria Kill, Tucking, Recycling, Etc.
- ❑ Water Testing Protocol Example
- ❑ Must Have a High Level Champion at E&P



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Water Management Evaluation at ULs

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- ❑ Frac Water Consumption on UL Rate in Current Oil Price Environment ~125 MMBPY
- ❑ Frac Water Consumption at \$70/BBL Oil Increased to ~185 MMBPY

- ❑ Water Commercialization Via Full-Cycle Water Management Strategy
 - Water Sourcing : Fresh/Brackish
 - Water Recycling
 - Water Disposal
 - Water Transfer
 - Water Impoundment

- ❑ Evaluation of Full-Cycle Water Management Companies
 - Developed Vendor Vetting Process.
 - “What We Want” Requirements Generated
 - Area Selection for Initial Projects with Future Expansion Options Based on Performance
 - Understand Cooperation between Area E&Ps – Linking Systems Together
 - Develop Financial Terms Options



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Water Management Evaluation at ULs

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- ❑ “What We Want” requirements
 - **Full- Cycle Water Management**
 - Fresh/Brackish Water Wells Constructed to UL Specs
 - Water Disposal Processes to Reduce Truck Traffic
 - New SWD Wells Constructed to UL Specs and Address Siesmicity
 - Water Transfer Processes Must Meet UL Specs
 - Water Impoundment (Recycled) Must Meet UL Specs
 - Water Recycling Technology Must Meet UL KPIs (As Per Agreed to with Area E&Ps)
 - Environmental Baseline Sampling Will be Conducted
 - Liability Bonds will be Required
 - **Must Reduce the Full-Cycle Cost of Water to E&P**
 - Must Generate a Meaningful Profit to UL



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Water Management Evaluation

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- ❑ Recycled Water In-Ground Pits Lease Agreement
 - In-Ground Pits Needed for Water Recycling due to Frac Volumes
 - Objective is to Encourage Produced Water Recycling/Reuse
 - Modeled After New Mexico Regulations with Additional Restrictions
 - Locations Restrictions included: Proximity to Schools, Hospitals, Etc.
 - > 500 MBBLs Requires Tandem (Devided) Design
 - Detailed Construction Specs: Liners, Berms, Leak Detection, Fencing, Bird Netting, Etc.
 - Specific Environmental Baseline and Closure Sampling
 - Routine Inspection and Reporting Process
 - Three Foot Feeboard Limitation with Automated Level Sensors
 - Annual Reporting Requirement Jan. 30
 - Detailed Closure Specs Including Specific Environmental Soil Testing
 - Removal Bond/Decommisioning Trust
 - This Document is Approved and on the UL Website



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Water Management Evaluation

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□ Questions??



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